Green Infrastructure Framework

Evidence & Analysis Document

a co-operative council

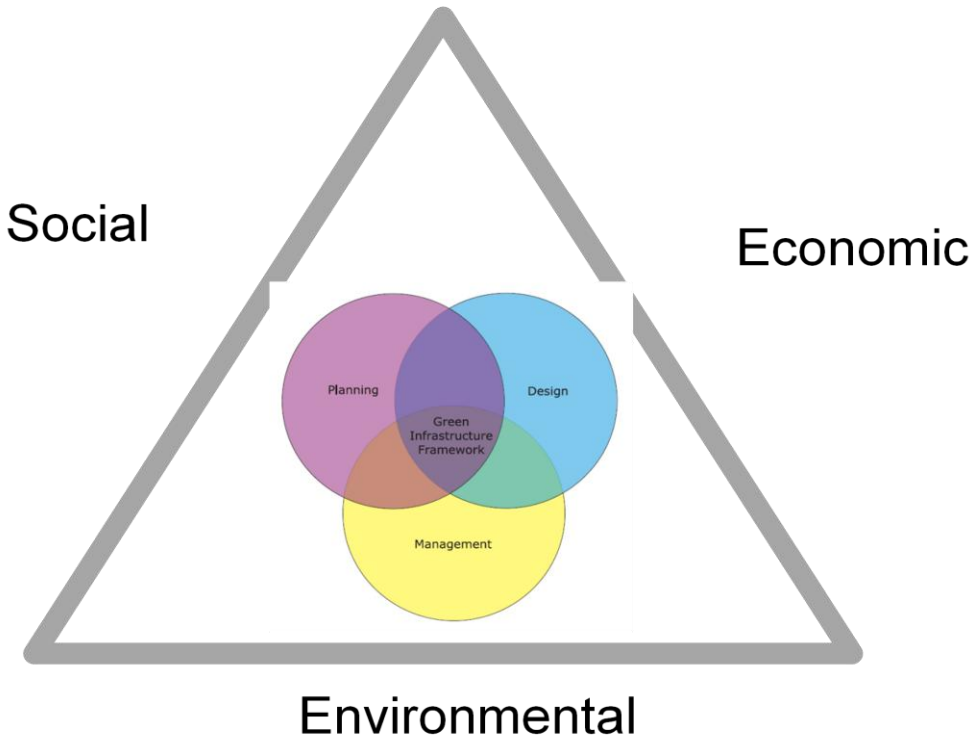
Telford & Wrekin COUNCIL

Contents

The Purpose of the Green Infrastructure Framework

A Green Infrastructure Framework is a strategy that co ordinates the planning, design and management of the green infrastructure in an area. It enables us to value, plan, design and manage every green space and natural feature, including water in an integrated and connected way; optimising its performance for multiple social, economic and environmental benefits.

The purpose of the Telford & Wrekin Green Infrastructure Framework is to provide a strategic planning framework to guide the planning, design and management of green infrastructure within the borough.



At a site level its purpose is to inform the design process with the ultimate aim of achieving a balance between development, community and environmental needs and benefits.

It is about arranging site features (both natural and man-made) to maximise the usefulness of a site for development, wider community and environmental benefits.

The Aim of the Green Infrastructure Framework

The aim of the Green Infrastructure Framework is to:

- Provide a co ordinated framework for the planning, design and management of every type of green and natural feature in the borough
- Provide a greater understanding of the many types of green and natural resources that are in the borough and what they can do
- Provide more information (Evidence & Analysis) about the borough's green and natural resources so that the council can make more informed and therefore better decisions about how to plan, design and manage the green and natural resources
- Help the council improve its planning policies on the planning and design of green infrastructure
- Help the council improve the planning, design and management of its green resources
- Provide local neighbourhoods and communities with the borough wide context about green and natural resources, consequently helping communities better understand how to plan, design and manage their green and natural resources in greater detail
- To understand the relationship to and contribution of green infrastructure to the economic, social and environmental life and planning of the borough

The Objectives of the Green Infrastructure Framework

The objectives of the Framework have been established following consultation with the projects stakeholders[1]. The objectives are:

- To provide an overarching framework for the planning, design and management of strategic and local green infrastructure in the borough
- To help co-ordinate strategic/regional cross boundary green infrastructure areas e.g. The Area of Outstanding Natural Beauty, The Ironbridge Gorge

[1] Please see the Appendix 1 for the full list of stakeholders.

World Heritage Site, the River Severn, the Shrewsbury and Newport Canal, National Cycle Ways and various Public Rights of Way

- To assist the borough in responding to the challenges of a changing environment;
- To maximise the benefits of green infrastructure in both rural and urban environments
- To enable the planning and design of the built and natural environment to be approached in a joined up and holistic way
- To help achieve sustainable development
- To improve the contribution of green infrastructure in attracting and retaining investment
- To embed a good understanding of green infrastructure and what it can do within the council
- To be able to assess and measure the role and contribution of green infrastructure in a more structured and objective way
- To apply green infrastructure in a more structured and objective way
- To help secure funding for the Green Infrastructure Framework actions including mechanisms to resource the long term management of both existing and new green infrastructure
- To establish criteria which recognises the functions and value of green infrastructure at a strategic level in order to prioritise sites which are most vulnerable or in need of immediate action
- To help establish a governance model for monitoring and reporting on green infrastructure linked to corporate annual reporting and performance management
- To ensure the Council can lead by example in promoting the benefits of green infrastructure
- To help the efficient and effective delivery of the Framework through partnership working

The Outcomes of the Green Infrastructure Framework

The projected outcomes the Green Infrastructure Framework are:

- Produce a robust strategic framework for the borough's green infrastructure
- Provide a secure evidence base for green infrastructure planning policies
- Achieve commitment from key internal (Council) stakeholders and key external stakeholders to the Green Infrastructure Framework

The Evidence & Analysis Document

The Green Infrastructure Framework Evidence & Analysis Document is a major component in the provision of an overall Green Infrastructure Framework. Its purpose is to:

- Improve the understanding of what green infrastructure is and what it can do
- Explain what a Green Infrastructure Framework is and its purpose
- Provide a useful green infrastructure data base
- Provide an analysis of the existing green infrastructure
- Provide a description of how the planning process can help the provision of green infrastructure

The Evidence & Analysis document is split into three main sections:

Part A: Background, Context and Evidence
Part B: Analysis
Part C: Planning Implementation

Part A: Background, Context & Evidence

Background

What is Green Infrastructure?

For the purposes of the Telford & Wrekin Green Infrastructure Framework, green infrastructure is defined as the term used to describe every public and private green space and natural feature including water in the borough.

It includes features as small as window boxes and private gardens and as big as parks, playing fields, road verges, woods, the landscaped areas in industrial parks, farmland ponds, lakes, streams and rivers. In short, it is everything that is not 'manmade' i.e. it does not include buildings (with the exception of green roofs and green walls), roads, streets and built structures

Vision

The vision for the borough's green infrastructure is derived from the Council's vision for the borough as a whole i.e. to be a successful, sustainable place. The vision for the Green Infrastructure Framework is that by providing a comprehensive and co ordinated strategy for the borough's green infrastructure we will not only derive maximum benefit from that resource but it will optimise its contribution towards achieving the overall vision for the borough.

Glossary

The following is a description of some of the specialist words and terms used in the Green Infrastructure Framework.

Aesthetics	This is concerned with the way things look (their appearance), what they communicate and the meanings we attach to things.
AONB: Area of Outstanding Natural Beauty	An area of landscape whose distinctive character and quality has merited protection. Protected under the Countryside and Rights of Way Act (2000).
ANGST: Accessible Natural Green Space Standards	Standards set by Natural England for the benchmark amount of accessible green infrastructure near to where people live.
Benefits	The products and uses that can be gained from green infrastructure e.g. reinforcing local identity, alleviating flooding problems, attracting investment into the area.
CIL: Community Infrastructure Levy	A new levy that local authorities can choose to charge on new developments in their area.
Conservation Area	Areas designated for protection due to their special architectural and historic interest.
Core Strategy	The primary compulsory development plan document that all local authorities must produce regarding the development and use of land in a local planning authority's area.
Ecosystem Services	Benefits people receive from the environment such as clean air and water.
Functions	The list of different roles green infrastructure can perform, such as habitat for wildlife, carbon storage and water infiltration. Green infrastructure can perform more than one function at a time.

Green Infrastructure	A term used to describe all of the green spaces and water in the borough. It enables us to value, plan, design and manage all aspects of greenery and water in an integrated and connected way; optimising its performance for multiple social, economic and environmental benefits.
Green Network	A local "saved" planning policy from the Wrekin Local Plan
IDP: Infrastructure Delivery Plan	A plan that identifies the future infrastructure requirements necessary to deliver the growth set out in the Shaping Places document.
Issues	Social, economic and environmental problems and opportunities that are present in the borough.
IMD: Index of Multiple Deprivation	This measures relative levels of deprivation in small areas of England called Super Output Areas[2].
LDF: Local Development Framework	The current structure of local planning policy. Each Local Authority has an LDF made up of local development plan documents, monitoring reports, statement of community involvement and other planning guidance.
LGS: Local Geological Site	Is a term for areas designated for their geological interest. Was previously known as Regionally Important Geological Site (RIGS).
LNR: Local Nature Reserve	All Local Authorities have the power to declare LNR's. They are areas of land which are protected for their value for wildlife, geology, education and public enjoyment.
Material Consideration	Evidence which is formally taken into consideration when assessing planning applications.
RHI: Renewable Heat Incentive	A government funded financial support scheme for renewable energy heat projects.
SFRA: Strategic Flood Risk Assessment	This is a document produced in partnership with the Environment Agency which shows the probability of flooding across the borough.

[2] Super Output Areas are a set of geographical areas developed following the 2001 census. They are often used as a way of spatially presenting data for an area. They are consistent in population size and not liable to change (like electoral wards).

SPD: Supplementary Planning Document	Documents prepared by a local authority to provide greater detail on the policies contained within its development plan documents.
SSSI: Site of Special Scientific Interest	They are the country's best sites for wildlife and geology. Natural England has the responsibility for identifying and designating them.
SUDS: Sustainable Urban Drainage System	Design feature which aims to reduce the potential impact of new or existing developments with respect to surface water drainage.
Third Sector	Organisations that are neither public nor private bodies, such as charities, and non-governmental organisations.
Types/Typology	The list of different types of green infrastructure. All green space is covered by this list of types such as agricultural land, cemeteries, and private domestic gardens. All other land is classed as not green infrastructure (buildings, roads, and other manmade infrastructure).
WHS: World Heritage Site	Land designated by UNESCO (United Nations Educational, Scientific and Cultural Organisation) for its heritage value and given extra protection from inappropriate development.

Context

The quantity, quality and distribution of greenery in the borough is the result of many physical, social, economic and historic factors. The purpose of this section is to describe the way in which this context has shaped and determined the existing provision of green infrastructure in the borough.

Landscape

The landscape of the borough is the result of natural and manmade activity and processes. It includes the undulating landscapes of Telford New Town, the 'upland' landscapes of the Wrekin and Ercall Hills and the low lying wet landscapes of the Weald Moors. There are a number of landscapes within the borough that have been 'designated' for protection, including an Area of Outstanding Natural Beauty and seven Conservation Areas which are addressed under the Policy and Planning section (see below).

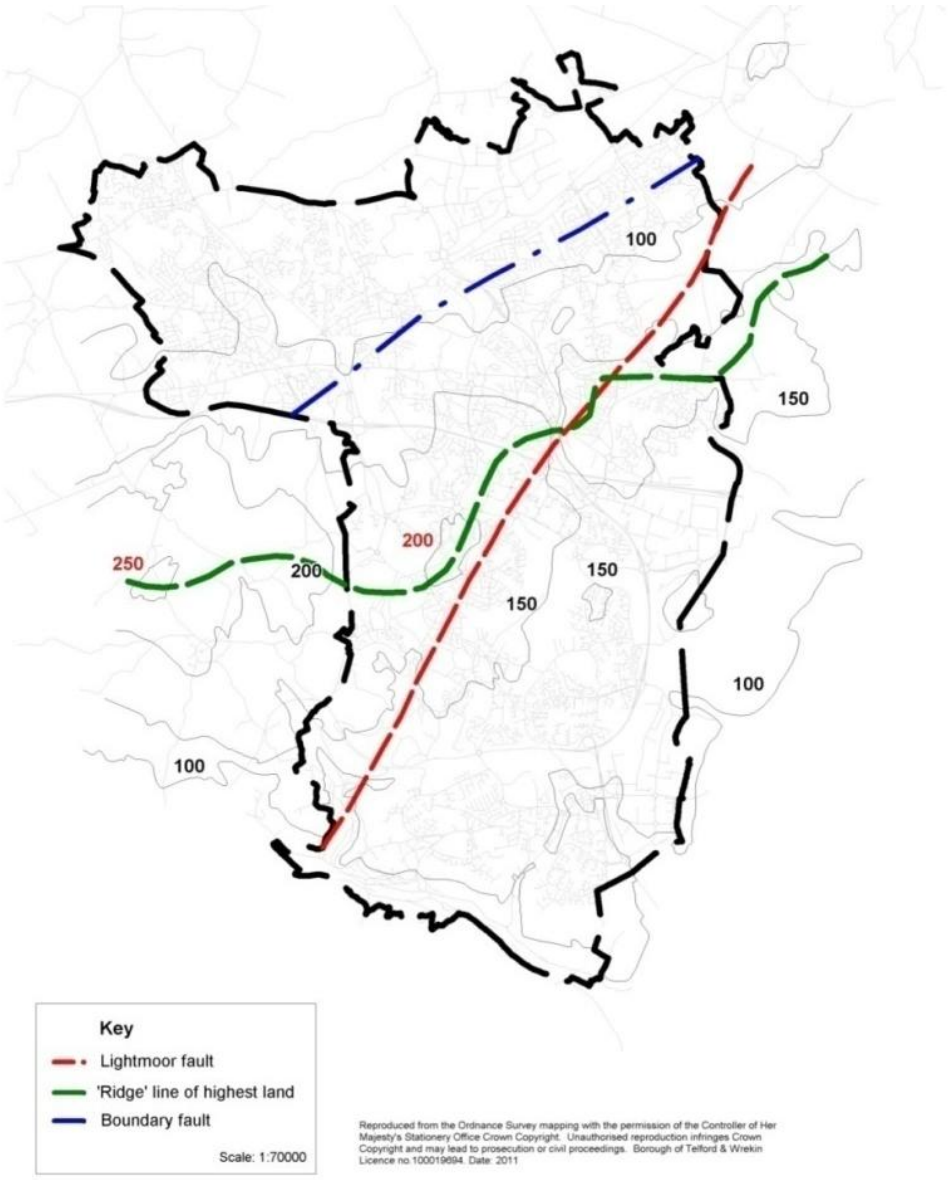
Geotechnical

The borough is divided into distinct areas according to its geology and its geological history, Figure 1 shows the key geological features in the Telford urban area.

To the north of the Boundary Fault which runs from Muxton to the Ercall Hill the geology is made up of sandstone overlaid with glacial fill. This is a predominantly low lying flat landscape supporting agricultural activity.

Between the Boundary Fault and the Lightmoor Fault the geology is a mix of sandstone and coal measures. The coal measures were relatively shallow and as a result the area was heavily mined using 'drift' or open cast mining in the 19th and early 20th centuries. Today this is a heavily reclaimed landscape.

Figure 1: Main geological features in urban Telford



The geology south of the Lightmoor Fault is also composed of sandstone and shallow coal measures. This landscape still bares the effects of its industrial past – not least the remnants of old pit heaps.

The consequence and impact of the geology on the borough cannot be overestimated. It has shaped and continues to not only shape the physical landscape, but is also a major reason why and how the area has been developed and can be developed in the future. Many of the areas which are green today are there because of geotechnical constraints which have prevented development due to

the costs of remediating them. This has also resulted in many areas of such land containing rich ecological habitats.

The following is a description of the main geotechnical features which are present in the borough.

Geological Feature:	Description:
Locally Important Geological and Geomorphological Sites[3]	LGS is a designation designed to protect sites that are important to the science of geology. Please see Figure 5 (page 27) for the location of LGS sites in Telford & Wrekin.
Landfill	Landfill sites are areas where waste has been buried and compacted. Many landfill sites are restored after rubbish tipping to green sites. After remediation there are still issues which need to be monitored, such as nearby water courses (to check for pollution), sinking of land as the waste settles and the concern over landfill gas and its management.
Land Instability	The underground geological structure of the Ironbridge Gorge and the effects of mining in the area have caused gradual land slippage for many years.
Contaminated Land	The industrial history of Telford & Wrekin has left a legacy of contaminated land. On a local level, some 1200 'sites of potential concern' exist[4]
Mineshafts	Numerous mine shafts and adits exist across Telford. Many of these are not recorded on any plans.
Soil Type[5]	Most of the soils in Telford are slightly acid loamy and clayey soils with impeded drainage, or restored areas of former mining. In the North East of the borough particularly around

[3] LGS (formerly known as RIGS)
[4] Telford & Wrekin (2009) Contaminated Land Strategy http://www.telford.gov.uk/downloads/file/827/contaminated_land_strategy
[5] All soil information from Cranfield University Soilscapes reporter http://www.landis.org.uk/soilscapes/

Geological Feature:	Description:
	Newport the soils are freely draining slightly acidic soils. The rest of the rural area is a mixture of soil types the majority of which have slightly impeded drainage. The area around the Weald Moors is naturally wet fen peat soils.
Flood Risk	To avoid inappropriate development the council has assessed areas and locations at risk of flooding. This assessment will inform the local development plan by diverting development away from areas at risk of flooding and ensuring appropriate measures are taken.

Social

Demographic Profile

As of mid 2010 the population of Telford & Wrekin was estimated at 162,613[6]. 84% of the population lives in Telford (136,639 people) whilst Newport and the rural area are reasonably evenly split with 10,913 people living in Newport (6.7%) and 15,061 living in the rural area (9.3%). These three areas of the borough will have different needs (in terms of green infrastructure) owing to the differing distribution of their populations.

There is a large working age population in the borough and a large proportion of the population is under the age of 16. In comparison there is a relatively small proportion of the borough's population that is over the age of 65. This situation is likely to change if the borough follows the national trend of an ageing population. This will have place different demands for future green infrastructure use and provision in the borough.

[6] ONS (2011) Mid-2010 Population Estimates for 2010 Wards in England and Wales http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-230924

Deprivation

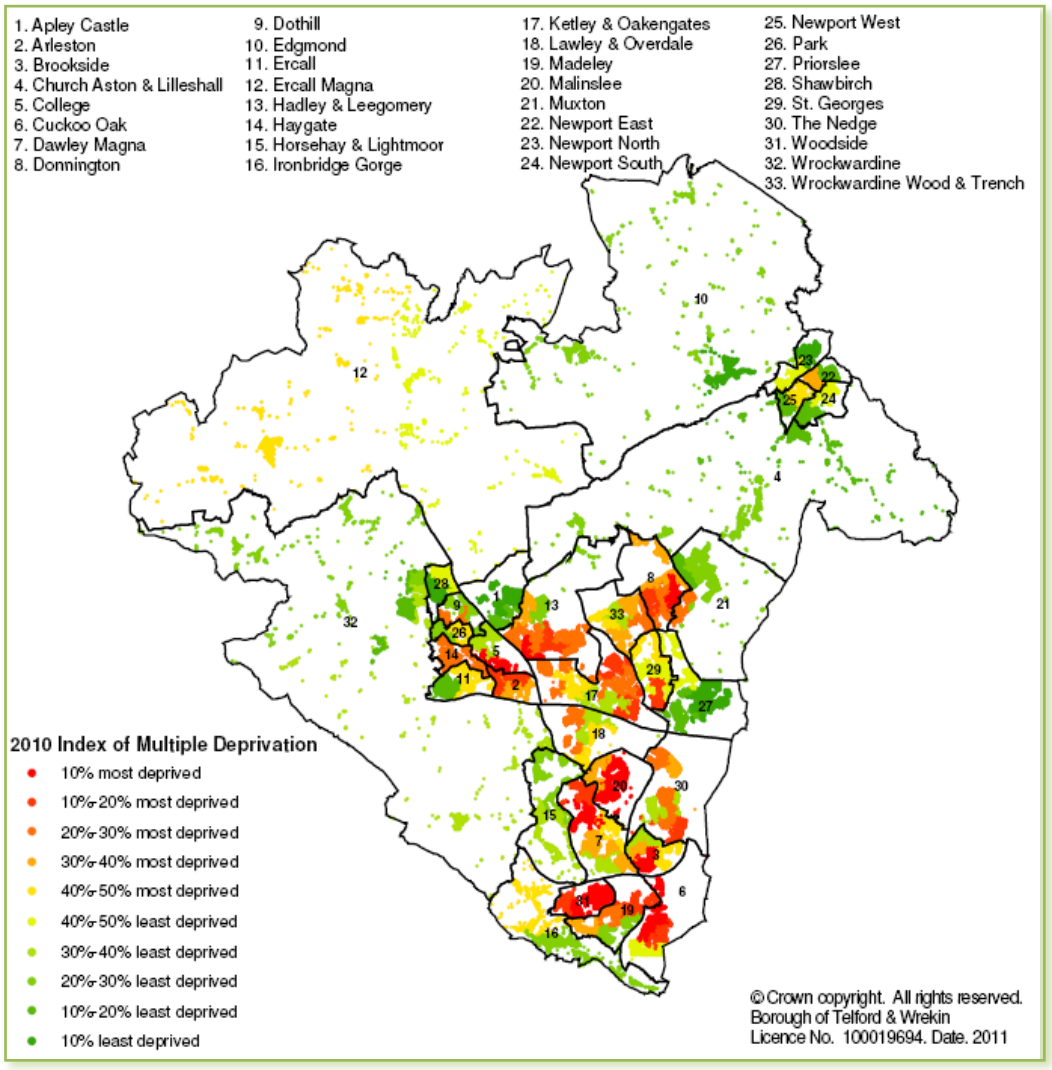
The West Midlands Regional Economic Assessment identifies that Telford & Wrekin suffers from pockets of deprivation and is in the top 30% most deprived districts in the West Midlands[7]. Levels of deprivation vary considerably across the borough. Some wards are in the 10% most deprived nationally (Woodside, Malinslee, College and Brookside) whilst others are ranked in the 10% least deprived (Priorslee, Shawbirch, Newport North, Apley Castle and Edgmond).

Figure 2 illustrates the pockets of deprivation in the borough and the wide variation that there is between the most deprived and the least deprived areas.

This variation in deprivation across the borough is reflected in life expectancy statistics. Male life expectancy at birth decreases from 80.6 years in the most affluent deprivation quintile to 74.3 years in the most deprived quintile.

[7] West Midlands Regional Economic Assessment: Telford & Wrekin (2008) http://www.wmro.org/resources/res.aspx?p=/CmsResource/resourceFilename/2249/RIEA-Telford-and-Wrekin_v3.0_Report_SH.pdf&r=KXs1e7DFtd

Figure 2 Deprivation levels in Telford & Wrekin

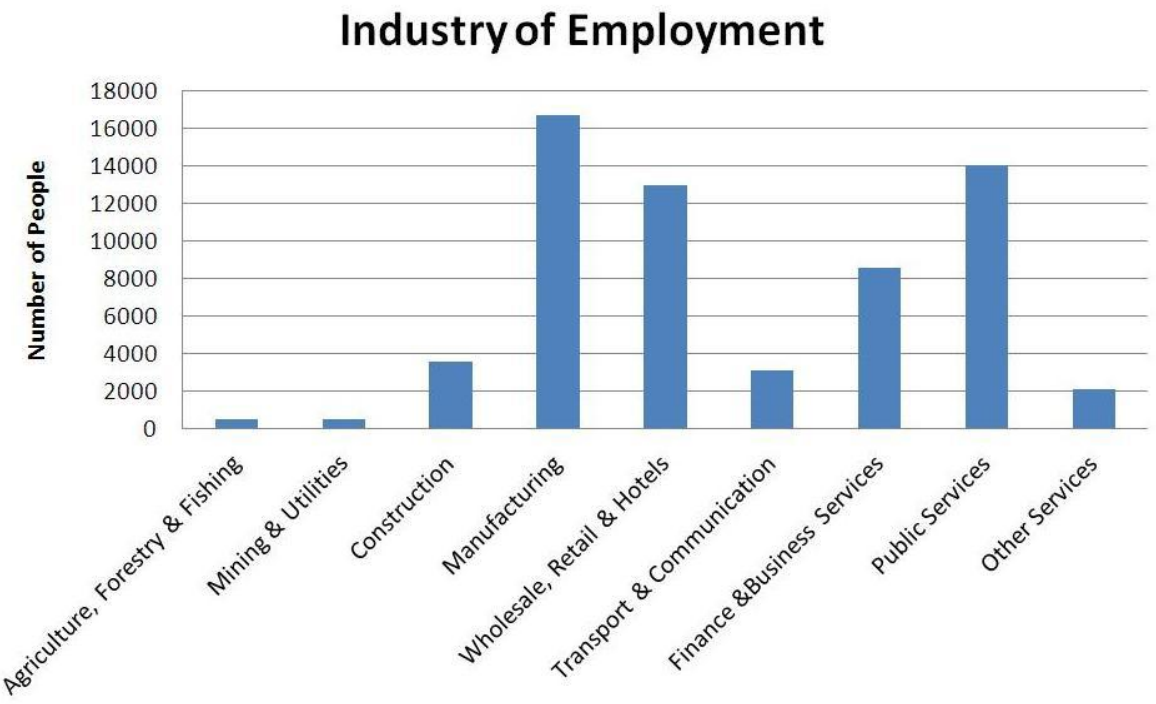


Economic

Telford & Wrekin has a strong industrial heritage. The overall influence of manufacturing remains strong in the borough, with it and the public services sector forming the largest employers. The West Midlands Regional Economic Assessment (2008) showed that there had been strong growth in the majority of sectors[8].

[8]West Midlands Regional Economic Assessment: Telford & Wrekin (2008) http://www.wmro.org/resources/res.aspx?p=/CmsResource/resourceFilename/2249/RIEA-Telford-and-Wrekin_v3.0_Report_SH.pdf&r=KXs1e7DFtd

Figure 3 Industry of employment (from 2001 census)



Policy and Planning

History of Planning for green infrastructure

The following table shows some of the key milestones in the history of green infrastructure planning.

General	Date	Local
Garden Cities	1900	
Rachel Carson's Silent Spring (1962)	1960	Telford Development Corporation Proposals provides the basis for Telford's open space structure, establishing Telford Town Park as the 'core' of an open space network
Emergence of 'Ecological Landscapes'	1970	Telford Development Corporation 'Landscape Structure Plan'

General	Date	Local
Brundtland Report (1987) **'Set-aside' schemes**	1980	The borough's first Local Nature Reserve and Country Park at Granville is approved (1987)
Earth Summit – Rio de Janeiro (1992) **UK Biodiversity action Plan (1994)**	1990	The Green Network Shropshire Biodiversity Action Plan Wildlife Sites
Countryside and Rights of Way Act (2000) **Environmental Stewardship Schemes (2000)** **Planning Policy Guidance note (PPG) 17** **Natural Environment & Rural Communities Act (2006)**	2000	PPG 17 Borough-wide Assessment of Open Space, Sport and Recreation Facilities is published (2008)
Draft Localism Bill **(Includes proposed 'local green space designation' that can be applied by communities to protect locally important green space)**	2010	Telford & Wrekin Green Infrastructure Framework (2012)

National Planning Policy Framework

The National Planning Policy Framework released on 27th March 2012 'sets out the Government's planning policies for England and how these are expected to be applied'[9].

This document replaces the guidance previously contained in Planning Policy Statements and Planning Policy Guidance.

[9] DCLG (2012) National Planning Policy Framework: Paragraph 1

The Framework contains a total of 219 paragraphs, 38 of which have green infrastructure related implications, 18 of which have direct and explicit green infrastructure implications.

The Framework provides a positive mandate for the provision and enhancement of green infrastructure. It allows for and encourages an approach to green infrastructure which recognises its multi functional value and its relationship to meeting social, economic and environmental priorities such as those that relate to promoting healthy communities.

The National Planning Policy Framework is a general document compared to the previous guidance it has replaced. A purpose of the Green Infrastructure Framework is to provide the necessary detailed interpretation of the Framework and to help inform and address issues of importance which have been highlighted within the Framework including:

- The need to optimise the use of land
- The need to positively and pro actively plan for better designed places
- The need to provide information that will aid the development process and lead to better informed decisions
- The need to co ordinate the provision of green infrastructure.

Regional Planning Policy

The Regional Development Agencies and Regional Assemblies of England were disbanded in 2010; this aligned with the revocation of Regional Spatial Strategies (RSS), which guided development from the regional level. However, some of the evidence contained in the Regional Spatial Strategy for the West Midlands[10] is still of relevance to the Green Infrastructure Framework.

[10] TSO (2008) Regional Spatial Strategy for the West Midlands http://www.wmra.gov.uk/Planning_and_Regional_Spatial_Strategy/Regional_Spatial_Strategy/Regional_Spatial_Strategy_%28RSS%29.aspx#Jan2008

The West Midlands Regional Spatial Strategy states that “Access to quality green space can contribute greatly to the Region's urban renaissance, improving the quality of life in urban areas providing opportunities for sport and recreation and supporting biodiversity. Maintaining, enhancing and, where appropriate, increasing the amount of green space is, therefore, an important factor in considering the most efficient use of land”.

Local Planning Policy

Telford & Wrekin Council, as the statutory local planning authority, has a range of current planning policy documents; these are described in the table below.

Local Planning Document:	Description and Relevant Policies:
Core Strategy[11]	Addresses the key spatial development issues for the borough and provides the strategic planning policy framework to guide development in Telford & Wrekin. Policy CS11 of the Core Strategy seeks to protect and enhance areas of open space, and policy CS12 seeks to protect designated sites and promote biodiversity.
Saved policies of the Wrekin Local Plan[12]	Contains more detailed policies which were adopted before the Core Strategy. One of these is the Green Network which is a protective designation for green spaces within Telford (covered by policies OL3, OL4 and OL5). Designated spaces such as Areas of Outstanding Natural Beauty, Sites of Special Scientific Interest and Local Nature Reserves are protected by policy OL2. All other open spaces in the borough that are not covered by a designation are protected by policy OL6.

[11] Telford & Wrekin Council (2007) Core Strategy Development Plan Document http://www.telford.gov.uk/info/856/local_development_framework/673/telford_and_wrekin_core_strategy

[12] Telford & Wrekin Council (2000) Wrekin Local Plan 1995-2006 http://www.telford.gov.uk/site/scripts/documents_info.aspx?categoryID=1004&documentID=370

Local Planning Document:	Description and Relevant Policies:
Central Telford Area Action Plan[13]	This is a detailed document to guide the development of the central area of Telford within and around the town centre. Although there is a strong focus on development in this area there are also policies for the protection and enhancement of green spaces, biodiversity and landscape (policies CT19, CT20, CT21 and CT22).

The Council is currently developing a new Local Plan called "Shaping Places"; this document is in the early stages of production. The Shaping Places Local Plan will contain policies covering a range of issues including green infrastructure.

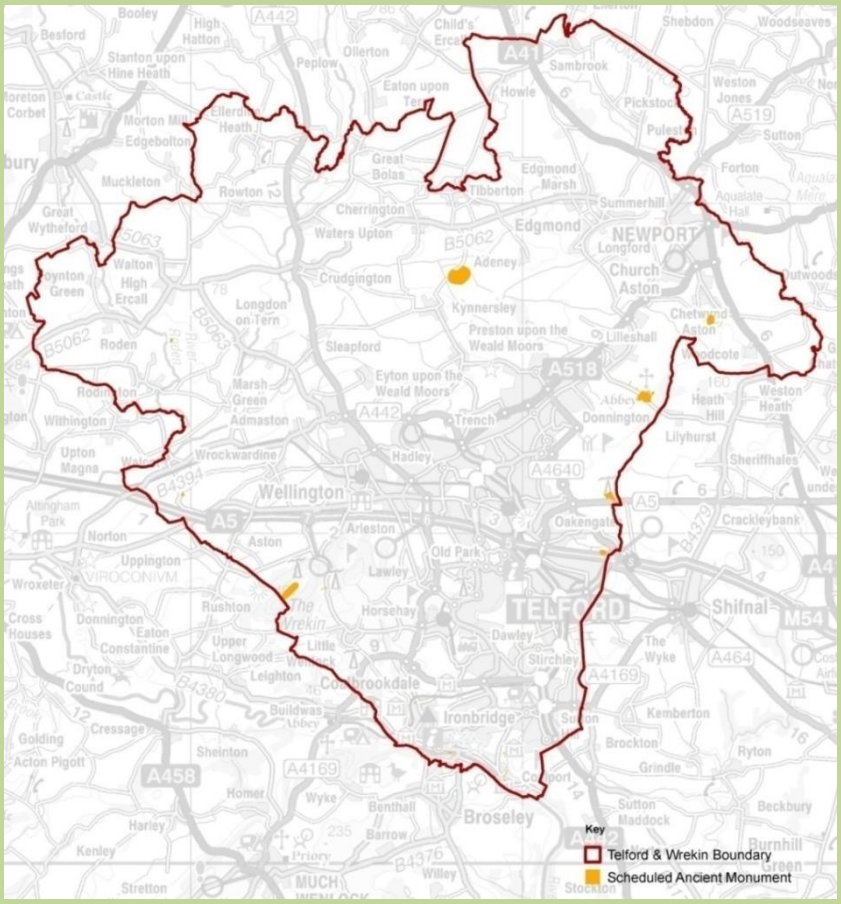
Other Designated Areas

Although many of the designated spaces in the borough are given additional protection under the local planning policies outlined above, many designations are set by other processes such as approval from bodies such as English Heritage and Natural England. Such other designations that are relevant to green infrastructure are set out below:

Heritage Designations

Designation:	Description:
Scheduled Ancient Monuments	The Schedule of Ancient Monuments register is compiled and maintained by English Heritage with final approval from the Secretary of State. Scheduled Ancient Monuments are classed as nationally important archaeological sites or historic buildings to be protected and preserved. There are 37 scheduled monuments in Telford & Wrekin

[13] Telford & Wrekin Council (2011) Central Telford Area Action Plan
http://www.telford.gov.uk/site/scripts/documents_info.aspx?categoryID=1004&documentID=366

Designation:	Description:
	Figure 4 Scheduled Ancient Monuments: 
Tree Preservation Orders	A Tree Preservation Order can be made by the Council under Section 198 of the Town and Country Planning Act, 1990[14]. The principal objective of a Tree Preservation Order is to prohibit the cutting down, uprooting, topping, lopping, willful damage, willful destruction of trees without the Council's consent. Written permission is needed to remove or do works to a protected tree.
Conservation Areas	Conservation Areas are areas designated by the Local Authority for their architectural or historic interest. The aim of the designation is to protect the character or appearance of the area. Planning controls are more stringent in Conservation Areas.
Historic Parks and Gardens	Parks and Gardens of special historic interest in England are contained in a register compiled and maintained by English Heritage. There are 3 Grade II historic parks and gardens registered

[14] HMSO (1990) Town and Country Planning Act http://www.legislation.gov.uk/ukpga/1990/8/contents

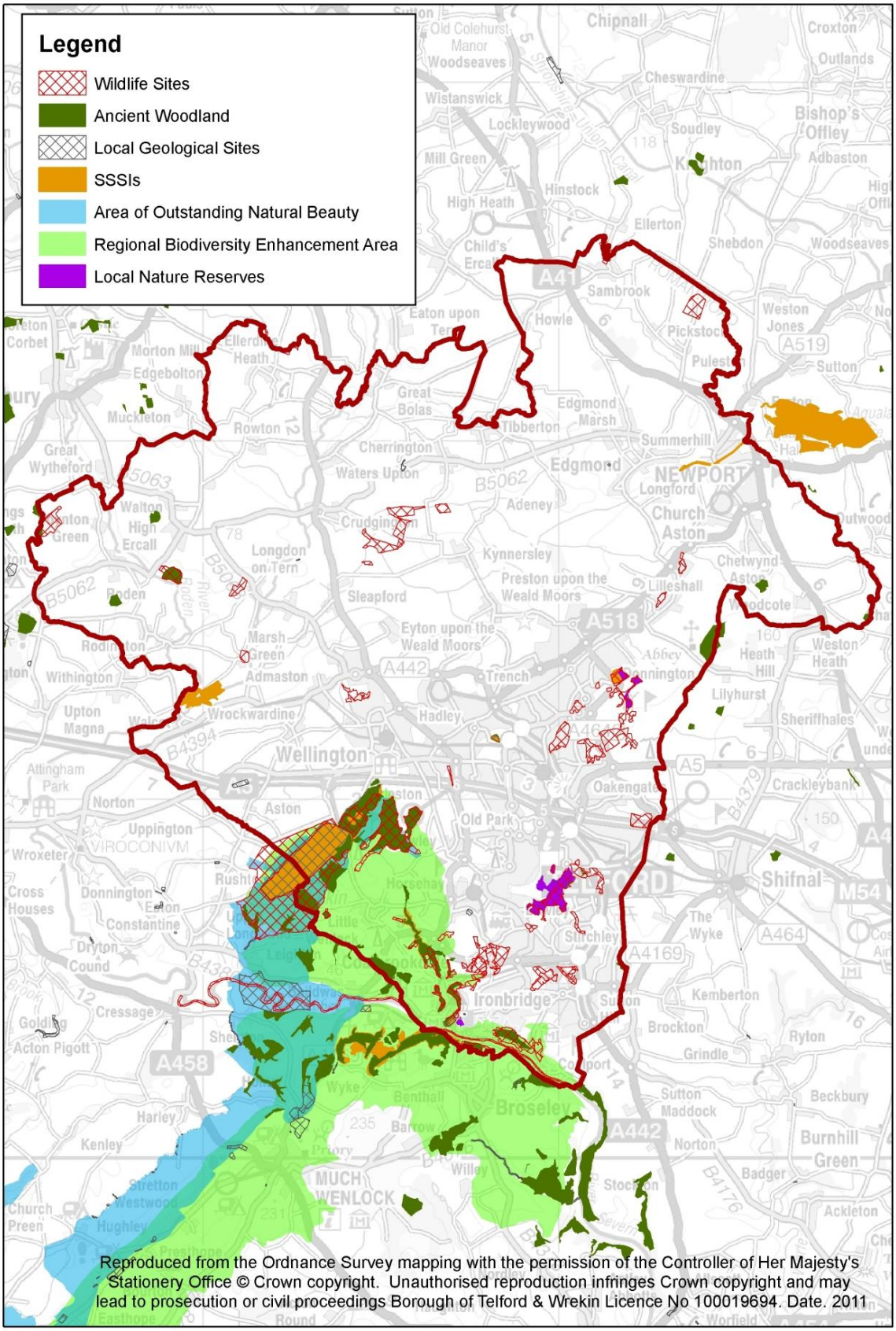
Designation:	Description:
	within the borough; Chetwynd Park, Lilleshall Hall and Orleton Park.
Ancient Woodland	Under PPS9 Biodiversity & Geological Conservation "Local planning authorities should identify any areas of ancient woodland in their areas that do not have statutory protection (e.g. as a SSSI). They should not grant planning permission for any development that would result in its loss or deterioration unless the need for, and benefits of, the development in that location outweigh the loss of the woodland habitat" [15]. See Figure 5.

Ecological Designations

Designation:	Description:
Wildlife Sites	Local Wildlife Sites are chosen by the Wildlife Sites Review Group, attended by Telford & Wrekin Council but led by the Shropshire Wildlife Trust. To qualify for designation a site must be of substantive nature conservation value in a Shropshire context. There are 40 Wildlife Sites in Telford and Wrekin (see Figure 5).
Sites of Special Scientific Interest (SSSI)	SSSIs are the country's very best wildlife and geological sites. They are designated by Natural England in order to conserve them for future generations. There are eight SSSIs in Telford & Wrekin: Alscott Settling Ponds, Lincoln Hill, Lydebrook Dingle, Muxton Marsh, New Hadley Brick Pit, Newport Canal, The Wrekin Hill & The Ercall, and Tick Wood & Benthall Edge Wood (see Figure 5).
Local Nature Reserves	"To qualify for LNR status, a site must be of importance for wildlife, geology, education or public enjoyment"[16]. There are currently 5 Local Nature Reserves in the borough; Granville Country Park, Limekiln Wood, Lodge Field, Telford Town Park and The Ercall and Lawrence's Hill, see Figure 5.

[15] DCLG (2009) Planning Policy Statement 9: Biodiversity & Geological Conservation http://www.communities.gov.uk/publications/planningandbuilding/pps9
[16] Natural England (2010) Local Nature Reserves in England: A Guide to their selection and declaration http://naturalengland.etraderstores.com/NaturalEnglandShop/NE301

Figure 5 Designated sites of nature conservation value



Local Green Infrastructure Related Strategies and Policies

As well as the local planning documents outlined above, Telford & Wrekin Council and other local bodies prepare other strategies which are relevant to green infrastructure. These are summarised below.

Document:	Description:
Community Strategy: Vision 2026[17]	The Community Strategy is prepared by the Telford & Wrekin Strategic Partnership. The shared Vision 2026 is for "A successful, prosperous and healthy community which offers a good quality of life for all the people of Telford & Wrekin". This will be achieved by the development of Telford & Wrekin as 'A Modern City', 'A Learning City', 'A Green City', 'A Safe, Caring & Healthy City' and an 'Innovative and Enterprising City'.
Local Transport Plan (2006 – 2011)[18]	The Local Transport Plan guides development of the transport infrastructure in the borough. The plan aims to protect and enhance the built and natural environment, limit the growth of traffic and pollution, enhance air quality and improve other quality of life issues by minimising environmental impacts of transport, create a more pedestrian/cycle friendly environment and reduce car use for short journeys. Policies SA5 and E3 are of particular relevance to these ambitions and to green infrastructure.
Climate Change Strategy (2008 – 2026)[19]	The borough's Climate Change Strategy aims to reduce greenhouse gas emissions and prepare for the impacts of a changing climate. It touches on the importance of green infrastructure in providing shading from the sun in an atmosphere with higher temperatures and in managing water in the landscape.

[17] Telford & Wrekin Strategic Partnership (2008) Vision 2026 http://www.telford-partnership.org.uk/NR/rdonlyres/324E60C8-AB62-40B1-A039-48F3037C9141/0/Vision2026update2009.pdf
[18] Telford & Wrekin Council (2006) Local Transport Plan 2006 – 2011 http://www.telford.gov.uk/info/100011/transport_and_streets/516/transport_policy/4
[19] Telford & Wrekin Council (2008) A Climate for Change http://www.telford.gov.uk/downloads/file/2371/a_climate_for_change

Document:	Description:
Local Climate Impact Profile (2009)[20]	A Local Climate Impact Profile enables local authorities to assess the risks from climate change and develop a robust climate change adaptation programme. Flooding was the most frequent event reported in Telford & Wrekin and there has been an increase in the number of flash flood events in recent years. Precipitation ahs been dramatically increasing in the autumn in the past 50 years and warmer weather is being experienced throughout the year, with the temperature on the warmest day increasing by over 2°C in the summer.
Shropshire Local Biodiversity Action Plan (2002)[21]	Telford & Wrekin Council is part of the Shropshire Biodiversity Partnership which oversees the biodiversity work within the county. The partnership produces the Local Biodiversity Action Plan (LBAP) and has proposed several Priority Areas for Action to be delivered in the coming years. These reflect Natural England's move away from habitat action plans and species action plans to a more integrated, landscape based approach[22].
Landscape Sensitivity and Capacity Study (2009)[23]	This assesses the landscape of the urban fringe areas of the borough to determine the suitability of sites for housing development. The study found that in terms of landscape sensitivity, there were medium to low impacts of sites around urban Telford, Newport and in some of the other settlements in the borough. Areas of higher sensitivity and lower capacity tended to be those in open countryside not closely associated with a settlement, acting as setting to conservation areas or listed buildings, in valley corridors, in floodplains, on steep or prominent

[20] Telford & Wrekin Council (2009) Local Climate Impact Profile: Summary Report http://www.telford.gov.uk/downloads/file/2107/local_climate_impact_profile_lclip-summary_report
[21] Shropshire County Council on behalf of the Shropshire Biodiversity Steering Group (2002) Shropshire Biodiversity Action Plan http://www.naturalshropshire.org.uk/ShropshireBiodiversityPartnership/tabid/37/Default.aspx
[22] Natural England (2009) Securing Biodiversity – A new framework for delivering priority habitats and species in England http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/framework.aspx
[23] White Consultants (2009) Telford & Wrekin Landscape Sensitivity and Capacity Summary http://www.telford.gov.uk/info/1004/planning_policy/386/landscape_character_assessments/2

Document:	Description:
	slopes or those forming gaps between settlements.
Shropshire Hills Area of Outstanding Natural Beauty (AONB) Management Plan (2009 – 2014)[24]	The Shropshire Hills Area of Outstanding Natural Beauty extends into the borough where it includes part of the Wrekin Hill. The AONB is valued for its richness of geology, wildlife and heritage, and its contribution to prosperity and wellbeing. The vision for the area set out in the Management Plan is for the natural beauty of the Shropshire Hills landscape to be conserved, enhanced and helped to adapt by sympathetic land management, for coordinated action and for its sustainable communities. There is also a strong emphasis on enabling the AONB area to adapt to climate change.
Ironbridge Gorge World Heritage Site Management Plan[25]	World Heritage Sites are cultural and environmental features identified by UNESCO as areas which should be protected for their safe keeping and protection for future generations. The Ironbridge Gorge World Heritage Site Management Plan highlights the importance of the green infrastructure as being vital to the character and setting of the area. The Management Plan is currently being updated and the revised plan will reflect the importance of the green infrastructure and link to this strategy.
Public Rights of Way Improvement Plan[26]	The Public Rights of Way Improvement Plan details ways in which the council will work to improve rights of way in the borough. The plan identifies that there are only 7.5 km of rights of way in the Weald Moors area of Telford & Wrekin, representing the smallest concentration in the borough. The adopted footpath and cycleway network is most prevalent in parishes in which there has been extensive New Town Development – Great Dawley, Hadley & Leegomery, Hollinswood & Randlay, Lawley & Overdale, Madeley, St Georges & Priorslee, Stirchley & Brookside.

[24] Shropshire Hills AONB Partnership (2009) Shropshire Hills Area of Outstanding Natural Beauty Management Plan 2009 – 2014 http://www.shropshirehillsaonb.co.uk/looking-after/management-plan/
[25] Ironbridge Gorge World Heritage Site Strategy Group (2001) Ironbridge Gorge World Heritage Site Management Plan
http://www.telford.gov.uk/info/100006/environment_and_planning/719/world_heritage_sites/4
[26] Telford & Wrekin Council (2009) Telford & Wrekin Draft Rights of Way Improvement Plan
http://www.telford.gov.uk/info/613/rights_of_way-information_and_advice/573/rights_of_way/2

Document:	Description:
Telford Town Park Strategic Framework (2006)[27]	The Telford Town Park Strategic Framework is provides direction and guidance for the future management and development of the Town Park until 2021. The document recognises the value of the park as a tourism and recreational resource for the borough. The Framework highlights the various formal and informal recreation opportunities that the park offers. It recognises the health benefits of the park and also highlights areas for improvement.
Cultural Strategy for Shropshire and Telford & Wrekin (2009 – 2014)[28]	The Cultural Strategy sets out the ways in which culture can help to drive economic sustainability and long term community well-being. The Strategy has seven key aims; improve health and well-being; 'Think Green and Live Green'; embed culture and creativity in formal, informal and lifelong learning; achieve regeneration and economic sustainability; build on our sense of place and sense of identity; connect people, places and organisations, and; prove the value of culture.
Children and Young People's Plan (2008 – 2011)[29]	The Children and Young People's Plan details the steps that will be taken to improve quality of life for children and their families in the borough. A list of priorities are aimed for in this plan; being healthy (reducing obesity and improving mental health); staying safe (improving provision and support for at risk children); enjoying and achieving (maximising achievement and enjoyment through learning, play, sport, leisure and cultural activities); positive contribution (encouraging children to support the community); economic wellbeing (securing opportunities and ensure access to employment and training for 13 – 21 year olds). Children and young people listed "Keep open green spaces in Telford and Wrekin" as one of their top priorities for this plan.

[27] Scott Wilson for Telford & Wrekin Council (2006) Telford Town Park Strategic Framework
[28] Shropshire Council and Telford & Wrekin Council (2009) Evolution, Revolution and Innovation: A Cultural Strategy for Shropshire and Telford & Wrekin 2009 – 2014 http://www.telford.gov.uk/info/200006/arts_and_entertainment/644/arts_development/2
[29] Telford & Wrekin Children's Trust (2008) Children & Young People's Plan 2008 – 2011 http://www.telford.gov.uk/downloads/file/530/children_and_young_peoples_plan_2008-11

Document:	Description:
Play Strategy (2007 – 2017)[30]	The Play Strategy supports children's wider health issues through play. Environmental play and contact with nature is identified as crucial to increasing children's awareness of the real world and develop into well rounded adults. The Play Strategy seeks to ensure that the council will actively encourage the right of children's informal play particularly in the landscape of open green spaces.
Playing Pitch Strategy (2009)[31]	The Playing Pitch Strategy details the council's policy for the provision and protection of playing fields and pitches. Playing fields also have special protection from development through planning regulations because of their role in health and wellbeing.
Telford & Wrekin Open Space, Sport and Recreation Facilities Study (2008)[32]	National Planning Policy Guidance note (PPG) 17 (see above) requires Local Planning Authorities to undertake a local assessment of need for and provision of open space, sport and recreation facilities. This study fulfils that requirement for the Telford & Wrekin area. It identifies areas of provision and deficiency for 8 different types of open space; Allotments, Amenity Green Space, Cemeteries and Churchyards, Natural and Semi Natural Green Space, Parks & Gardens, Provision for Children, Provision for Young People and Outdoor Sports Facilities. Overall the assessment found that the deficiencies in the amount of all types of open space were worst in the north east of Telford whilst Newport had relatively good provision. The assessment made a number of recommendations based on these findings and it suggested minimum standards for the future provision of these different types of open space in order to address these deficiencies.

[30] Telford & Wrekin Council (2007) Local Play Strategy 2007 – 2017
[31] Telford & Wrekin Council (2009) Playing Pitch Strategy
[32] PMP (2008) Borough of Telford & Wrekin Open Space, Sport and Recreation Facilities Study
http://www.telford.gov.uk/site/scripts/documents_info.aspx?categoryID=1004&documentID=385

Woodland Trust: Space for People[33]

Space for People is designed to help the green space decision making process and demonstrates that woodland has a large part to play in people's quality of life. The Woodland Trust set standards which state that people should have access to woodland of an adequate size within easy reach of where they live. Although its focus is on towns and cities, it is equally applicable to rural areas. The standard is expressed as:

- No person should live more than 500m from at least one area of accessible woodland not less than 2ha in size
- That there should also be at least one area of accessible woodland no less than 20 ha within 4km of people's homes

Within the Trust's assessment for Telford & Wrekin it reports that:

- 49% of the population has access to 2ha+ of woodland within 500m
- 92% of the population has access to 20ha+ of woodland within 4km

Natural England: A Space for Nature (ANGST)[34]

Space for Nature sets the following standards for accessible natural green space:

- A green space of at least 2ha not more than 300m from home
- At least one green space of 20ha within 2km of home
- At least one green space of 100ha within 5km of home
- At least one green space of 500ha within 10km of home
- A local nature reserve provision of a minimum of 1ha per 1000 population

The standards are justified by the promotion of everyday contact with nature to benefit well-being and quality of life, everyone being able to enjoy this contact without having to make any special effort or journey to do so, natural green space in

[33] Woodland Trust (2010) Space for People: Targeting action for woodland access http://www.woodlandtrust.org.uk/en/about-us/publications/key-publications/space-for-people/Pages/space-for-people.aspx

[34] English Nature (1996) A Space for Nature http://naturalengland.etraderstores.com/NaturalEnglandShop/IN46

towns and cities to play an important part in helping to safeguard wildlife and geological features, everyone having an excellent chance to learn about nature and to help protect it in practical ways, and adequate provision of vegetated areas to ensure that urban areas continue to function ecologically.

Green Infrastructure Prospectus for the West Midlands Region[35]

The Green Infrastructure Prospectus for the West Midlands aims to promote green infrastructure within the region as an essential element of sustainable communities and an asset which should be invested in, improved and championed. The Prospectus focuses on the economic, social and environmental benefits of investing in green infrastructure. It provides evidence that investing in green infrastructure is worthwhile.

Shrewsbury & Atcham Green Infrastructure Strategy[36]

The Shrewsbury & Atcham Green Infrastructure Strategy provides up to date information and guidance as the basis for conserving, enhancing and extending the green infrastructure resources and assets in Shrewsbury & Atcham. The strategic links of green infrastructure are recognised; in particular the cycle path that links the town of Shrewsbury with the borders of the town of Telford is mentioned.

[35] The West Midlands Woodland and Forestry Forum (2007) Green Infrastructure: A Prospectus for the West Midlands Region http://www.wmro.org/displayResource.aspx/5561/Green_infrastructure_A_prospectus_for_the_West_Midlands_region.html

[36] TEP (2008) A Green Infrastructure Strategy for Shrewsbury & Atcham

Evidence

A key aim of the Green Infrastructure Framework is to identify what green infrastructure currently exists in the borough; what it is (the type), where it is (the distribution) and what it is currently doing (how it functions).

Comprehensive mapping of green infrastructure of the entire borough has been undertaken using a Geographic Information System (ArcGIS) computer programme and a mapping methodology adapted from the North West Green Infrastructure Unit[37] using automated processes and visual checking against aerial photography.

Types of Green Infrastructure

The green infrastructure in the borough has been organised into 16 types i.e. it has been categorised into 16 different types of green space, green feature and water feature[38]:

Green Infrastructure Type	Photographic Example	Description/Definition
Agricultural Land		Usually associated with food production (growing of crops and the rearing of animals). Mainly consists of fields, which may include scattered trees and hedgerows. Access and recreation functions may be present on site where there is public access. Ownership is predominantly private or landowner leased.

[37] A detailed paper has been produced by the North West Green Infrastructure Unit: http://www.greeninfrastructurenw.co.uk/resources/A_Green_Infrastructure_Mapping_Method.pdf
[38] More detailed fact sheets for each type of green infrastructure are provided in Appendix 2

Green Infrastructure Type	Photographic Example	Description/Definition
Allotments & Community Gardens		Usually associated with the cultivation of fruit and vegetables on a small scale. Occasional trees and hedgerows may lie at the external boundaries of sites. Sites have value as a recreational resource, and as a space for learning about nature and food production.
Cemeteries, Churchyards & Burial Grounds		Areas which act as a resting place for the dead and quiet contemplation for the living. Often attached to religious grounds and buildings or specifically designed space for burials near to urban areas. Usually council owned or on private church grounds. Usually grassland with scattered trees, shrubs and flowers, cut flowers may be laid. Sites have maintained footpaths and benches.
Incidental Green Space		Areas which have been left over after planning and areas that have been left intentionally such as village greens or space used as a buffer for example roadside verges. This type usually consists of mown grass. They are usually council owned, are publicly accessible and can be large or small areas of land.

Green Infrastructure Type	Photographic Example	Description/Definition
Grassland, Heathland, Moorland, Scrubland		Grasslands are areas where the dominant type of vegetation is grasses. Heathlands and moorlands are areas associated with acidic ground where the dominant type of vegetation is low growing woody species. Scrubland areas often occur on previously developed land, where pioneer species thrive. This type of land is quite varied and often has a more “natural” wild appearance. Such land is often used for public recreation.
Green Roofs		Green roofs are roofs that are either partially or completely covered in vegetation, they can be found on buildings, shed and garages. Their popularity is growing in the UK, as an effective method of adapting to climate change and controlling and reducing energy use within buildings. Ownership varies, depending on the building, between private and public.
Institutional Grounds		Spaces found around commercial, industrial and retail buildings. For example offices, schools, shops, factories, hospitals and residential care homes. Usually consists of grassed landscape, scattered shrubs and trees. Varies between public and private space depending on the building that it relates to.

Green Infrastructure Type	Photographic Example	Description/Definition
Orchards		Land where fruit growing trees dominate the vegetation type. Includes orchards where fruit is grown and sold for commercial gain. Where these are publicly owned there is usually a strong community focus.
Outdoor Sports Facilities		All green land used for sports, it does not include Astroturf or other artificial pitches. Examples include golf courses, football pitches and grass running tracks. Sites usually contain large expanses of grass with border trees, shrubs and flowers. Predominantly used for public recreation and physical activity.
Parks, Public Gardens & Recreation Grounds		The primary use of parks, public gardens & recreation grounds is for recreation. Sites can vary from large grassed areas, to lakes, trees, and planted beds. Some parks and gardens will also contain roads, play equipment, cafes and visitor centres. They are usually publicly owned and publicly accessible.
Private Domestic Gardens		Private domestic gardens often make up a significant part of the green fabric of urban areas. Sites vary widely in size, from a small back yard to large fields. Private domestic gardens could contain a variety of trees, shrubs, grass, flower beds, fruit and vegetables. As private spaces they have little or no public access.

Green Infrastructure Type	Photographic Example	Description/Definition
Street Trees		Street trees are trees planted in the public realm, usually alongside roads and in town squares. They vary from small trees in residential areas, to large grand trees in town centre squares, though trees of any size can be found in any area. They are usually publicly owned but they can be privately owned if on private land (e.g. long private driveways).
Water Bodies		Small or large expanses of open water, includes lakes, ponds, reservoirs and harbours. Water bodies can be actively used e.g. for water sports or for aesthetical quality in a development. Ownership varies between private and public, as does access.
Water Courses		Small or large channels of moving water, both natural and man-made. Includes rivers, streams, and canals. Also bankside areas where these are not already identified under a different type. Ownership and access varies between public and private.

Green Infrastructure Type	Photographic Example	Description/Definition
Wetlands		Wetlands are areas of land where the soil is saturated with water, some or all of the time. Land of this type has expanses of water, wet habitats, including fen, marsh, bog and wet flush vegetation. Vegetation in these areas has to be adaptable to high water levels. They may have a “wild” appearance. Ownership varies and they are sometimes publicly accessible via boardwalks or viewing platforms.
Woodlands		Woodland is land where trees are the dominant vegetation type. There are many different types of woodland, coniferous, non coniferous, ancient, semi natural etc. All are included in this type. Woodlands vary in size, density, age, ownership, and species composition. Sites may be commercially managed for timber production or maintained as woodland for public recreation or as a habitat.

All land which is composed of built ‘man made’ development such as buildings and roads is categorised separately as ‘Not Green Infrastructure’.

Not Green Infrastructure		Everything that is man-made and not green space, such as buildings, roofs, roads, footpaths, town squares, and car parks. Buildings with green roofs do not count as not green infrastructure.

Types of Green Infrastructure in Telford & Wrekin

All of the above types of green infrastructure have been mapped on individual maps of the borough apart from Green Roofs and Street Trees (due to the current absence of data). This has produced 14 typology maps showing the location of each type of green infrastructure, and one typology map showing the location of 'not green infrastructure'. These can be viewed in Appendix 3.

The individual maps enable us to see the distribution of the different types of green infrastructure across the borough and to calculate the percentage of green infrastructure in different areas (see Table 1, Table 2, and Table 3).

These individual maps have are displayed on one composite map showing all of the different types of green infrastructure in one map, Figure 6.

Figure 6 Telford & Wrekin Green Infrastructure Composite Typology Map

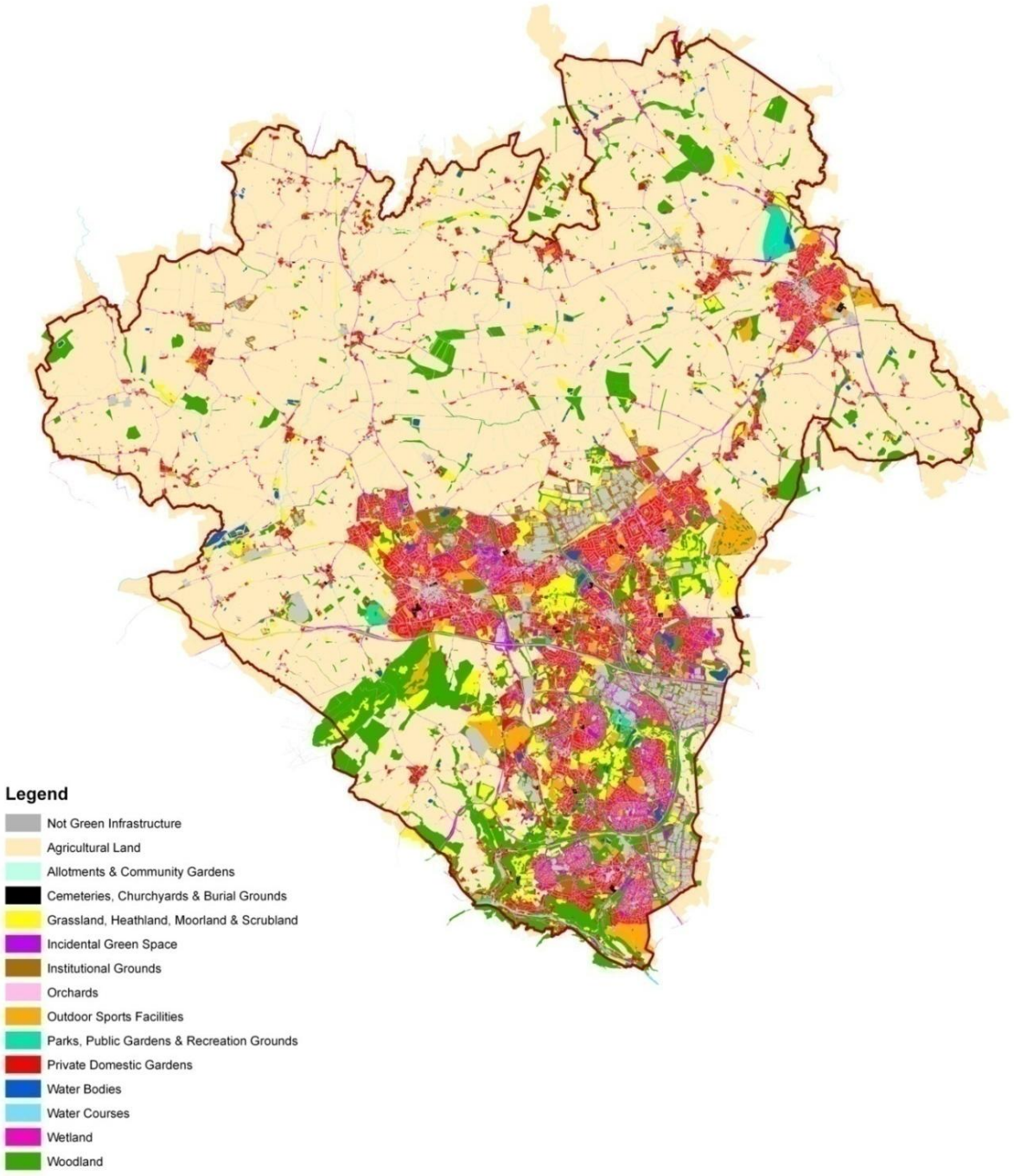


Table 1 shows the area of the borough covered by each of the individual types.

Table 1 Area of each green infrastructure type (in hectares)

Type of green infrastructure	Area in ha	Percentage of borough
Agricultural Land	18088.5	62.29%
Not Green Infrastructure	2850.6	9.82%
Woodlands	2502.3	8.62%
Private Domestic Gardens	2057.5	7.09%
Grassland, Heathland, Moorland, Scrubland	1237.4	4.26%
Incidental Green Space	784.5	2.70%
Institutional Grounds	515.7	1.78%
Outdoor Sports Facilities	498.3	1.72%
Water Bodies	184.9	0.64%
Parks, Public Gardens & Recreation Grounds	122.9	0.42%
Water Courses	118.6	0.41%
Cemeteries, Churchyards & Burial Grounds	35.7	0.12%
Wetlands	28.6	0.10%
Allotments & Community Gardens	11	0.04%
Orchards	1.6	0.01%
Street Trees	No data	No data
Green Roofs	No data	No data
Total	**29038.1**	**100.00%**

Functions of Green Infrastructure

Different types of green infrastructure can do different things, i.e. different types of green infrastructure can perform different functions.

Function:	Definition:
Accessible Water Storage	Water stored in ponds, lakes, reservoirs and certain wetlands. This water is accessible for human use and for irrigation should it be required.
Aesthetic	All green infrastructure has aesthetic value. Judging what green infrastructure has 'good' aesthetic value is not explored in the strategy but is highlighted as an area for action

Function:	Definition:
Biofuels Production	Using vegetation as biofuels – a form of energy production. Biofuel crops include wood from trees which may be coppiced, miscanthus, rapeseed and waste from other crops.
Burial Space	Space which is used for the storage of dead bodies and quiet reflection for the living.
Carbon Storage[39]	The natural process of removing carbon from the atmosphere and storing it in plants, trees and soils. Trees and peat soils are particularly important types of green infrastructure for storing carbon. Varying types of green infrastructure will take different amounts of time to sequester carbon; some types of green infrastructure are slow growing in nature and therefore will take longer to sequester carbon. Stored carbon in trees will stay locked away inside the wood if felled.
Corridor for Wildlife[40]	Conduit of green and blue spaces through which wildlife can disperse to and from habitat spaces. This function will increase in importance in the future; species will need the capacity to move upwards and northwards as the climate changes. Connectivity is vital for this function. Different types of green infrastructure will provide a corridor for a widely different range of species. Range of species will also be dependent on other factors such as climate and disturbance.
Cultural Asset[41]	Green space used for cultural purposes, the hosting of public art, events and festivals. Examples include international garden festivals and sculpture parks.
Evaporative Cooling[42]	As plants transpire water is evaporated from their surfaces cooling their immediate locality. All types of green infrastructure can provide this function, including open water. Plants with a larger leaf area are

[39] Milne & Brown (1995) Carbon in the Vegetation and Soils of Great Britain *Journal of Environmental Management* **49**, p413-433
[40] Bond, M. (2003) Principles of Wildlife corridor Design, Centre for Biological Diversity. http://www.biologicaldiversity.org/publications/papers/wild-corridors.pdf
[41] http://www.forestry.gov.uk/fr/urgc-7EEGHM
[42] Department of Health (2010) Heatwave plan for England: Protecting Health and Reducing Harm from Extreme Heat and Heatwaves http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_114430

Function:	Definition:
	likely to be better than those with a smaller leaf area. During a drought, irrigation is likely to be necessary to maximise this function in plants, whilst open water will continue to be valuable in its own right.
Flow Reduction through Surface Roughness[43]	The speed and amount of water passing through a site can be reduced by vegetation. If the site has a varied green topography as opposed to hard standing, water will be retained onsite for longer, potentially helping to reduce flooding. Some types of green infrastructure perform this function more than others – for example, a woodland floor tends to be rougher than grass.
Food Production	Land used for growing crops or the grazing of animals.
Green Travel Route	Off road routes through greenery for pedestrians and cyclists (for recreational purposes as well as for getting between places), can include public rights of way, Sustrans, and private routes which are not on roads. Useful in urban areas and often located close to large centres of population. Also includes the green infrastructure which surrounds green travel routes, making them an attractive alternative route.
Ground Stabilisation [44]	Root structures of all vegetation can help improve the strength and stability of soil, holding together the top soil and preventing it from eroding.
Habitat for Wildlife[45]	Providing a habitat for wildlife – a place to live with a source of food. Different types of green infrastructure will provide habitats for a widely different range of species. The range of species will also be dependent on other factors such as climate and disturbance.
Heritage[46]	Historic links in the landscape (including ancient woodlands, canals,

[43] Forest Research (2011) Slowing the Flow at Pickering Phase 1 Final Report http://www.forestry.gov.uk/fr/INFD-7ZUCQY
[44] Nisbet *et al*. (2004). A Guide to Using Woodland for Sediment Control. www.forestresearch.gov.uk/pdf/englandwoodlandforsedimentcontroljune04.pdf/$FILE/englandwoodlandforsedimentcontroljune04.pdf
[45] http://www.bbc.co.uk/nature/habitats

Function:	Definition:
	designated sites and monuments). Heritage is "that which is inherited".
Inaccessible Water Storage[47]	Water stored in soils and vegetation. Certain types of sustainable urban drainage systems and soils will store large amounts of water. Certain soils such as clay and peat will store more water than others. This water is inaccessible for human use or for irrigation.
Learning[48]	Opportunities for lifelong learning. Green infrastructure can provide a backdrop for outdoor classrooms and learning outside of the indoor school environment, and also a setting for learning new skills that may help adults back to work.
Noise Absorption[49]	Screening of noise, especially from major transport routes. Requires certain types of green infrastructure which are tall enough to intercept and absorb sound waves. Factors important for noise reduction include visibility, width, height and length of the trees. This function is usually associated with more urban areas, especially close to travel routes.
Pollutant removal from Soil/Water[50]	Vegetation can remove pollutants from soil and water. For example green infrastructure at the side of the road can clean contaminated road runoff (therefore reducing concentrations of pollutants such as heavy metals). Certain plants can also remove pollutants from contaminated soil.
Recreation – Private	Land which is used for recreation but only by owners of the land or those invited by the owners to use. This includes private gardens and other privately owned green spaces to which access for the public is prohibited.

[46] Recognised by English Heritage through the green flag award scheme http://www.english-heritage.org.uk/professional/advice/advice-by-topic/parks-and-gardens/public-parks-and-open-spaces/green-flag-awards-and-green-heritage-site-scheme-/
[47] http://www.sepa.org.uk/land/soil/why_soil_is_important.aspx
[48] Examples include Forest Schools and Offenders & Nature schemes http://www.forestry.gov.uk/fr/INFD-6ZABBK
[49] Fang & Ling (2003) Investigation of the noise reduction provided by tree belts. *Landscape and Urban Planning* **63**(4), p187-195
[50] College of Agriculture, Food & rural Enterprise. (2008) Treating Farmyard Dirty Water Using Constructed Wetlands http://www.dardni.gov.uk/ruralni/constructed_wetlands_dpdb.pdf

Function:	Definition:
Recreation – Public	Anyone can use for recreational purposes (formal/informal and active/passive), without having to pay or have access to keys. Can include areas which are closed at night, on specific days, or seasonally but a judgement call will be required as to whether this restricts public use. Can include sports fields, fishing lakes, playgrounds, and open access land.
Recreation – Public with Restrictions	Public use for recreational purposes (formal/informal and active/passive) is allowed but is restricted to those who pay or have keys. Can include sports fields, golf courses, fishing lakes, allotments, etc, but not public rights of way.
Shading from the Sun[51]	Shading of people, buildings, and surfaces from solar radiation to reduce temperatures and increase comfort levels. Usually provided by trees and taller plants and vegetation. Particularly found in urban areas to reduce the urban heat island, this function will become more critical as we have to adapt to a changing climate. Green infrastructure which provides shade will also be important for protecting agricultural land and other species from solar damage.
Timber Production	Growing trees and woodlands for timber, this includes for use as a substitute for other materials. Can be on a large scale for construction materials or a smaller scale for smaller wood products. Stored carbon in trees will stay locked away inside the wood if felled.
Trapping Air Pollutants[52]	Removal of pollutants, especially ozone, nitrogen dioxide and particles from the air, through uptake via leaf stomata and deposition on leaf surfaces. Once inside the leaf, gases diffuse into intercellular spaces and may be absorbed by water films to form acids or react with inner leaf surfaces. This function is usually associated with more urban areas, especially close to travel routes.

[51] Huang, *et al*. (1990) The Wind-Shielding and Shading Effects of Trees on Residential Heating and Cooling Requirements. ASHRAE Winter Meeting, American Society of Heating, Refrigerating and Air-Conditioning Engineers. Atlanta, Georgia.
[52] Nowak *et al*. (2006) Air pollution Removal by Urban Trees and Shrubs in the United States. *Urban Forestry and Urban Greening* **4**, p115-123

Function:	Definition:
Water Conveyance	Green infrastructure can transport water to areas which are in need of water and also away from areas at risk of saturation or flooding. Examples include rivers and canals. Irrigation ditches in agricultural land are another example of water conveyance.
Water Infiltration[53]	Vegetation and roots aid in the movement of rainwater and floodwater into the ground. Green infrastructure will help water to drain naturally into the soil. Includes both surface infiltration and deep infiltration. Green infrastructure is a permeable surface as opposed to hard surfacing such as concrete. It aids in the natural passage of water to the ground – helping reduce the risk of flooding.
Water Interception[53]	Interception of rainwater before it reaches the ground, e.g. by the leaves of trees and plants. This will slow the flow of water to the ground. All types of green infrastructure will intercept water in some way, though certain types with a greater leaf area will intercept a greater amount and slow its flow to greater extent. This can help to reduce the risk of flooding.
Wind Shelter[54]	Green infrastructure can provide shelter from winds at a local level by slowing or diverting currents. Different types of green infrastructure will perform this function to greater extents, trees and shrubs will be better at performing this function.

Mapping Green Infrastructure Functions

A type of green infrastructure is judged to provide a function only if it is considered to do so at a level above a reasonable threshold. For example; types of green infrastructure such as an area of agricultural land will only perform a public recreation function if it has public access such as a Public Right of Way running through it, i.e. a set of criteria is required to establish when (under what circumstances) a certain type of green infrastructure provides a certain function.

[53] http://www.woodlandtrust.org.uk/en/moretrees-moregood/Documents/Trees-flooding.pdf
[54] http://apps.rhs.org.uk/advicesearch/Profile.aspx?pid=624

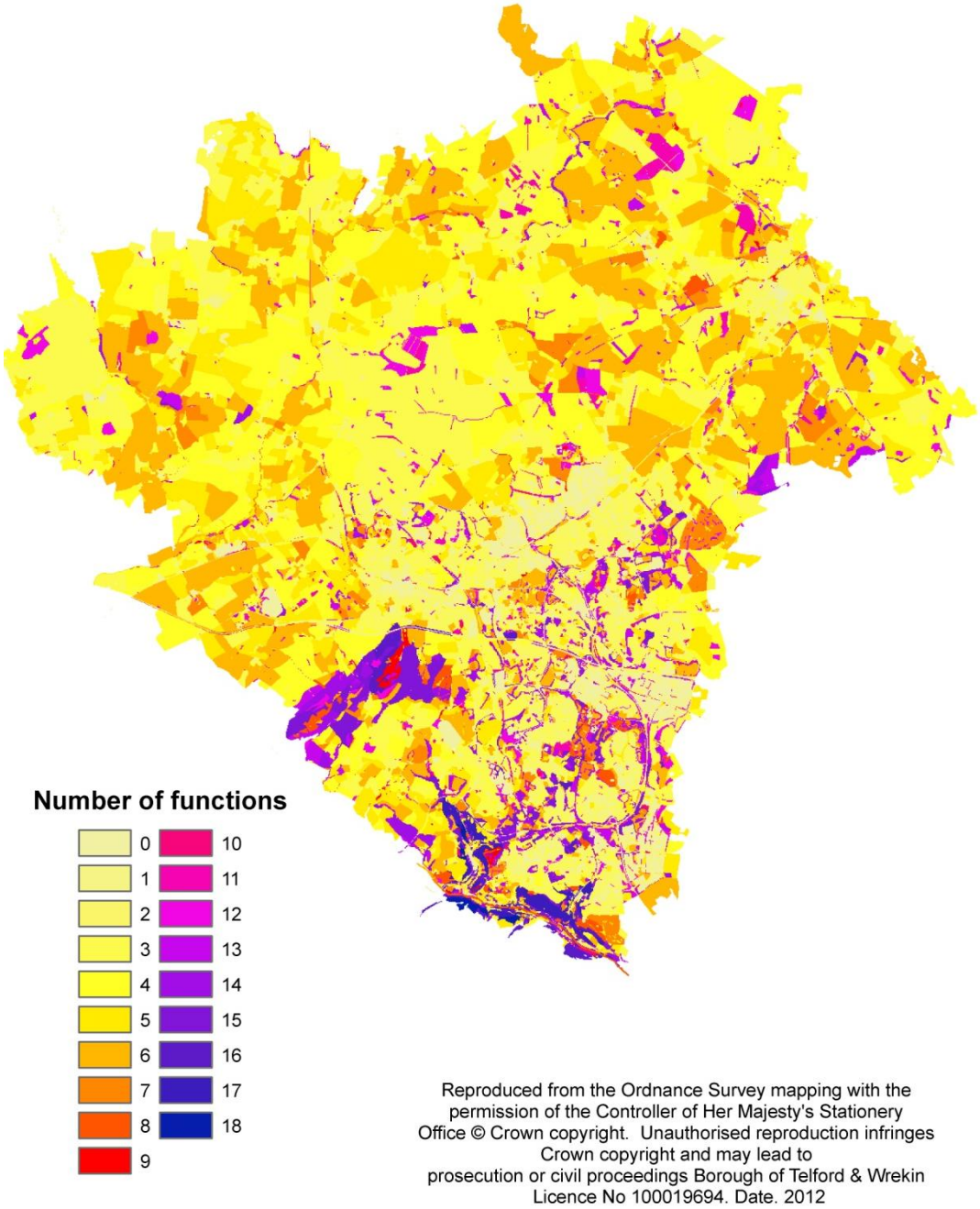
The criteria and thresholds used by the Telford & Wrekin Green Infrastructure Framework are based upon a set of criteria and thresholds originally created by the North West Green Infrastructure Unit, and subjected to a series of internal and external workshops and consultation exercises to make them locally specific to Telford & Wrekin. To view the criteria used see Apendix 4.

Green Infrastructure Functions in Telford & Wrekin

A map has been produced for each function using the typology mapping data and the function threshold criteria which show where green infrastructure is performing which functions in the borough (these maps are in Appendix 5, a confidence assessment has also been produced, located in Appendix 6).

Figure 7 (overleaf) shows where green infrastructure is performing functions and the number of functions being performed by green infrastructure in those locations.

Figure 7 Functions performed by green infrastructure in Telford & Wrekin



Note: Whilst the ability of a type of green infrastructure in a particular location to perform many functions is an indication of good performance it is not the only measurement of good performance. Good (optimising) performance is also about the ability of a type of green infrastructure in a particular location to perform a function well – which in some circumstances could be a little as one function.

Part B: Analysis

Introduction

The following is an analysis of the borough's green infrastructure according to:

Types: Initial observations that can be identified from an examination of the typology mapping data. The typology data is based upon December 2010 mapping data. Updating and maintaining the accuracy of this data is important. The typology data has been mapped at a borough wide level and the analysis is therefore related to this level. Scrutiny of green infrastructure at a neighbourhood and site level can use this data but will require more detailed information and interrogation.

Functions: Initial observations that can be identified from an examination of the function mapping data

Themes: The relationship of green infrastructure to the social, economic and environmental issues of the borough.

Types

The typology mapping provides a comprehensive borough wide picture of the type, quantity and distribution of green infrastructure in Telford & Wrekin.

Borough Wide Analysis

The following table assess the different types of green infrastructure in the borough, looking at the percentage of land area occupied by each type and observations regarding the distribution of the different types of green infrastructure

Table 2 Typology analysis

Type	Area	% of each area	Quantity	Distribution
Agricultural Land	Borough	62.29	The largest land use in the borough	Whilst the urban area of Telford is characterised by a merge of green infrastructure and the built environment, many edges are distinguished by sharp distinctions
	Telford	5.64	A comparatively high percentage of agricultural land considering this is the borough's main urban area. Related to the formation of the town boundary (as an artificial designation) rather than a boundary formed by the 'natural' expansion of the town	Primarily located in the south east of the town
	Newport	2.09	Very small land use within the 'traditional' urban form of Newport	Located round the fringes of the town
	Rural Area	82.18	The substantial majority of this type is (as would be expected) located in the rural area	Located almost wholly in the rural area
Allotments & Community Gardens	Borough	0.04	A very low incidence of a very useful green infrastructure type	Primarily located in the urban area of Telford Located in the higher areas of population i.e. south Telford
	Telford	0.13		
	Newport	0.05		
	Rural Area	0.01		
Cemeteries, Churchyards & Burial Grounds	Borough	0.12	(Comparison required)	A very scattered distribution, primarily in the urban areas
	Telford	0.29		
	Newport	1.06		
	Rural Area	0.05		

Grassland, Heathland, Moorland, Scrubland	Borough	4.26	The occurrence of this type is associated as much by the affects of human activity (the remnants of mining and industry) as it is by its natural geographic location	Often associated with the highway network Mostly located in the Telford area
	Telford	10.31	Largest quantity is to be found in the urban area which is potentially a reflection of the affects of human activity rather than geographic reasons	More strongly located in the west and north of Telford
	Newport	0.60	A higher % than expected in part due to the Newport Canal	Mostly located to the west and in association with the Newport Canal
	Rural Area	2.27	Low incidence	Thinly scattered
Green Roofs *	Borough	N/A	Not mapped	Not mapped
Incidental Green Space	Borough	2.70	A large quantity of land without an apparent designated purpose	Often associated with the highway network
	Telford	8.12	A high quantity of land for which there is no prescribed or identified purpose	Linear patterns suggesting a strong association with highways
	Newport	3.35	A large quantity of land without an apparent designated purpose	Scattered (not as highway related as the rest of the borough)
	Rural Area	0.87	Minimal. A reflection on the ‘efficiency’ of the rural area to be a ‘productive’ landscape	Almost entirely associated with the highway network
Orchards	Borough	0.01	A very low incidence of a very useful green infrastructure type	Uneven distribution (two key areas located in south Telford)
	Telford	0.03		
	Newport	0.00		
	Rural Area	0.01		
Outdoor Sports Facilities	Borough	1.72	A reflection of the proportion of the borough which is rural area	Primarily located in urban areas
	Telford	3.58	A lower % of provision compared to Newport	Even distribution across the town. Golf courses dominate the data
	Newport	4.97	A higher % of provision compared to Telford	Clustered

	Rural Area	1.04	Low provision	Extremely dispersed
Parks, Public Gardens & Recreation Grounds	Borough	0.42	A small quantity	An uneven distribution One large provision dominates to the north of Newport
	Telford	0.42		
	Newport	0.51		
	Rural Area	0.42		
Private Domestic Gardens	Borough	7.09	There is a large amount of private garden land in the urban areas of Telford and Newport and a low quantity of private garden land in the rural area.	Strongly related to the two urban areas
	Telford	20.40	Whilst Telford is known for its largely public Green Network, a large proportion of its green infrastructure is provided by private gardens	Greatest density in the northern parts of Telford Reflects urban settlement form (clustered and dispersed)
	Newport	43.18	A high proportion of green infrastructure is provided by private land	Dense grain
	Rural Area	2.10	A low quantity reflecting the small amount of settlement	Associated with the dispersed settlement pattern
Street Trees *	Borough	N/A	Not mapped	Not mapped
Water Bodies	Borough	0.64	(Comparison required)	A very even and scattered distribution across the borough with little distinction between rural and urban areas
	Telford	0.96		
	Newport	0.11		
	Rural Area	0.54		
Water courses	Borough	0.41	Extensive small water courses and a nationally significant UK river (River Severn)	An extensive quantity of small water courses in the rural area reflecting its low lying flat landscape and geology
	Telford	0.34		
	Newport	0.21		

	Rural Area	0.43		A significant river in the south of the borough Two distinctive watersheds (one to the north and one to the south – split along a ridgeline running west – east from The Wrekin to Redhill.
Wetlands	Borough	0.10	A small quantity	A scattered and relatively even distribution (biased towards the south east) Some associated (though not entirely) with water courses.
Woodlands	Borough	8.62	Overall the borough is not a very wooded place with notable exceptions: southern parts of Telford, The World Heritage Site, The Wrekin	The greatest quantity of woodland is located in the south of the borough – particularly on and around the Wrekin and the Ironbridge Gorge Often associated with the highway network
	Telford	15.21	A generous woodland cover within the urban area (higher than that for the rural area)	Extensive and relatively even distribution – with greatest in the south Many linear patterns and often associated with highways
	Newport	0.69	Very low woodland quantity as would be expected in the compact townscape of a 'traditional' market town	Small pockets of woodland
	Rural Area	6.51	With the exception of the Wrekin, the borough's rural area is a comparatively open landscape	A number of larger plantations but otherwise a very thinly scattered distribution
Not Green Infrastructure	Borough	9.82	Over 90% of the borough is composed of green infrastructure	Two urban areas

	Telford	28.58	Almost 75% of the urban area of Telford is composed of green infrastructure. A reflection of Telford's unique planning heritage and geotechnical conditions Main employment areas are located on the edge of the urban area Settlement is clustered – reflecting the planning history of the town	A dispersed clustered morphology
	Newport	39.24	Green infrastructure occupies over 60% even in the 'traditional' and relatively compact morphology of Newport	Compact urban morphology
	Rural Area	3.10	Sparsely settled area	Very dispersed settlement patterns

Ward Analysis

In Table 3 the data contained in the typology mapping has been arranged according to wards within the borough. This provides us with an overview of what type and how much green infrastructure exists in each ward and enables us to compare and identify broad features and patterns of distribution of green infrastructure across the borough.

Out of the 33 wards in Telford & Wrekin, the predominant type of green infrastructure currently is:

- Private domestic gardens in 8 wards ,
- Agricultural land in 7 wards
- Woodlands in 1 ward

NB ‘Not green infrastructure’ was the predominant type in 17 wards

Many of the rural wards have high percentages of agricultural land, Ercall Magna ward is 89% agricultural land. Ironbridge Gorge ward has the highest percentage cover of woodlands; it also has the largest percentage cover of water courses across the borough. Ercall ward has the highest amount of cemeteries, churchyards & burial grounds in the borough. In Park ward over 50% of the ward is classed as private domestic gardens and there are relatively high proportions of institutional grounds in College ward and Donnington ward. This shows that much of the green infrastructure resource is in private ownership.

Table 3 Percentage of each ward covered by each green infrastructure type

Ward	Agricultural Land	Allotments & Community Gardens s	Cemeteries, Churchyards & Burial Grounds	Grassland, Heathland, Moorland, Scrubland	Incidental Green Space	Institutional Grounds	Not Green Infrastructure	Orchards	Outdoor Sports Facilities	Parks, Public Gardens & Recreation Grounds	Private Domestic Gardens	Water Bodies	Water Courses	Wetlands	Woodlands	Grand Total
Apley Castle	33.21%	0.00%	0.00%	2.12%	6.17%	13.79%	16.82%	0.00%	0.34%	0.22%	14.86%	1.34%	0.16%	0.00%	10.97%	100.00%
Arleston	0.00%	0.00%	0.24%	7.64%	14.57%	3.84%	36.20%	0.00%	0.00%	0.00%	35.11%	0.00%	0.04%	0.00%	2.36%	100.00%
Brookside	0.00%	0.00%	0.13%	2.25%	19.79%	1.82%	31.82%	0.00%	0.89%	0.00%	27.94%	3.26%	0.10%	0.00%	12.01%	100.00%
Church Aston & Lilleshall	82.45%	0.00%	0.04%	1.18%	1.07%	0.69%	2.87%	0.01%	1.15%	0.07%	2.78%	0.53%	0.34%	0.02%	6.80%	100.00%
College	0.00%	0.00%	0.58%	1.85%	5.70%	17.48%	36.59%	0.00%	10.82%	0.00%	23.00%	0.02%	0.02%	0.00%	3.93%	100.00%
Cuckoo Oak	0.28%	0.16%	0.00%	6.16%	9.05%	7.90%	37.46%	0.00%	11.75%	0.00%	9.32%	0.14%	0.13%	0.00%	17.64%	100.00%
Dawley Magna	4.24%	0.15%	0.32%	15.07%	5.96%	2.73%	24.04%	0.00%	3.57%	0.11%	24.24%	0.87%	0.01%	0.26%	18.43%	100.00%
Donnington	1.47%	0.00%	0.22%	2.96%	5.17%	17.30%	42.83%	0.00%	1.47%	2.90%	23.27%	0.19%	0.06%	0.00%	2.15%	100.00%
Dothill	0.00%	0.00%	0.00%	12.59%	10.08%	4.55%	23.76%	0.00%	10.31%	0.00%	27.48%	3.49%	0.11%	0.04%	7.58%	100.00%
Edgmond	83.62%	0.00%	0.04%	1.98%	0.81%	0.26%	2.61%	0.01%	0.14%	1.43%	2.33%	0.66%	0.42%	0.21%	5.47%	100.00%
Ercall Magna	89.12%	0.00%	0.03%	1.00%	0.60%	0.39%	2.59%	0.00%	0.03%	0.00%	1.89%	0.33%	0.52%	0.02%	3.48%	100.00%
Ercall	5.05%	0.82%	2.83%	7.85%	5.81%	0.63%	25.16%	0.08%	7.59%	1.27%	38.84%	0.20%	0.01%	0.00%	3.85%	100.00%
Hadley & Leegomery	21.34%	0.25%	0.25%	12.47%	6.16%	8.97%	28.11%	0.00%	1.40%	0.00%	14.21%	0.23%	0.41%	0.07%	6.11%	100.00%
Haygate	3.12%	0.08%	0.00%	4.43%	3.95%	8.83%	45.88%	0.05%	0.00%	0.00%	32.39%	0.00%	0.03%	0.44%	0.79%	100.00%
Horsehay & Lightmoor	16.75%	0.00%	0.11%	11.70%	11.02%	2.08%	16.81%	0.00%	9.65%	0.00%	15.11%	1.58%	0.08%	0.46%	14.66%	100.00%
Ironbridge Gorge	18.53%	0.35%	0.38%	9.54%	1.62%	1.52%	10.56%	0.17%	0.77%	0.55%	11.81%	0.13%	3.20%	0.05%	40.82%	100.00%
Ketley & Oakengates	0.00%	0.00%	0.63%	11.46%	8.99%	3.74%	31.13%	0.00%	2.64%	0.71%	23.86%	1.32%	0.06%	0.06%	15.39%	100.00%
Lawley & Overdale	9.80%	0.00%	0.05%	14.80%	10.99%	3.67%	33.33%	0.00%	0.63%	0.00%	14.06%	0.25%	0.02%	0.02%	12.39%	100.00%
Madeley	0.43%	0.04%	0.77%	3.65%	6.39%	7.59%	27.88%	0.28%	4.96%	0.00%	25.77%	0.65%	0.01%	0.02%	21.56%	100.00%
Malinslee	2.27%	0.00%	0.33%	14.53%	9.22%	3.87%	25.35%	0.00%	4.59%	3.77%	16.49%	1.51%	0.02%	0.00%	18.04%	100.00%
Muxton	42.23%	0.00%	0.44%	13.58%	2.29%	0.81%	9.46%	0.00%	10.30%	0.01%	8.44%	0.45%	0.07%	0.40%	11.52%	100.00%
Newport East	15.61%	0.00%	0.00%	11.89%	6.43%	0.24%	25.26%	0.00%	0.00%	2.18%	36.57%	0.15%	1.57%	0.00%	0.09%	100.00%
Newport North	29.66%	0.00%	0.21%	8.45%	4.65%	3.01%	18.00%	0.00%	6.67%	0.00%	25.52%	0.01%	1.89%	0.29%	1.63%	100.00%
Newport South	9.68%	0.75%	2.51%	4.86%	2.97%	6.01%	33.98%	0.00%	11.64%	0.00%	25.99%	0.17%	0.02%	0.00%	1.41%	100.00%
Newport West	14.29%	0.19%	0.20%	0.22%	3.94%	2.89%	43.98%	0.00%	1.68%	0.00%	31.79%	0.03%	0.00%	0.00%	0.79%	100.00%
Park	0.00%	0.00%	0.00%	1.91%	3.48%	4.36%	33.20%	0.00%	4.21%	0.00%	52.49%	0.00%	0.11%	0.00%	0.25%	100.00%
Priorslee	18.93%	0.00%	0.18%	9.64%	10.07%	4.32%	19.07%	0.00%	2.07%	0.00%	20.16%	4.03%	0.01%	0.05%	11.47%	100.00%
Shawbirch	3.50%	0.00%	0.00%	15.14%	9.96%	0.65%	24.83%	0.00%	0.00%	0.00%	33.46%	1.08%	0.45%	0.00%	10.93%	100.00%
St. Georges	0.00%	0.00%	0.65%	9.94%	4.32%	0.41%	28.80%	0.00%	0.40%	0.36%	35.43%	0.00%	0.00%	0.00%	19.67%	100.00%
The Nedge	11.67%	0.25%	0.00%	8.48%	9.45%	6.34%	32.95%	0.00%	3.16%	0.00%	9.40%	1.06%	0.12%	0.05%	17.07%	100.00%
Woodside	5.99%	0.00%	0.01%	7.79%	16.40%	2.45%	32.76%	0.00%	0.00%	0.00%	19.28%	0.01%	0.03%	0.00%	15.29%	100.00%
Wrockwardine	71.87%	0.03%	0.04%	4.38%	1.13%	0.23%	4.95%	0.01%	1.29%	0.39%	3.04%	0.69%	0.39%	0.14%	11.42%	100.00%
Wrockwardine Wood & Trench	0.00%	0.17%	0.47%	3.97%	7.36%	8.84%	38.18%	0.00%	7.50%	0.41%	26.53%	2.25%	0.00%	0.00%	4.31%	100.00%
Grand Total	62.29%	0.04%	0.12%	4.26%	2.70%	1.78%	9.82%	0.01%	1.72%	0.42%	7.08%	0.64%	0.41%	0.10%	8.62%	100.00%

Functions

The function data provides a comprehensive borough wide picture of where different types of green infrastructure are performing different functions and the number of green infrastructure functions being performed by a type of green infrastructure in different locations in the borough.

This section is a description of initial findings based upon what we can observe from that data.

Note: It is important to note that whilst the ability of a type of green infrastructure in a particular location to perform many functions is an indication of good performance it is not the only measurement of good performance. Good (optimising) performance is also about the ability of a type of green infrastructure in a particular location to perform a function well – which in some circumstances could be a little as one function

General Analysis

The function mapping shows two prominent areas of the borough which perform high numbers of functions; the Wrekin Hill and the Ironbridge Gorge. Both of these areas have the highest number of functions performed anywhere in the borough. Since these two areas include significant amounts of woodland this also highlights the value of this type of green infrastructure in performing multiple functions.

In certain areas of the borough e.g. Hortonwood and central Newport the green infrastructure performs very few functions. This is not in itself an indication that the green infrastructure in these locations is performing badly but it highlights the need for greater examination – to explore the possibility of increasing the number of functions.

Analysis by Function

Accessible Water Storage

There is a relatively even spread of accessible water storage function across the borough with noticeable concentration around the Allscott Settling Ponds.

Aesthetic

All green infrastructure has been classed as performing the aesthetic function. The implications of this require further investigation.

Biofuels Production

Two large areas of the borough stand out as performing biofuels production; these are the Wrekin Hill and woodland plantations in the rural area. It is unknown if this resource is actually utilised as biofuels.

Burial Space

There is little coverage of green infrastructure performing the burial space function across the borough. The two largest cemeteries are at Audley Avenue in Newport and Haygate Cemetery in Wellington.

Carbon Storage

The woodland of the Wrekin Hill stands out as areas performing carbon storage. There is also a large amount of this function present in urban Telford.

Corridor for Wildlife

Urban Telford has more connected corridors for wildlife than Newport and the rural area. Large parts of the rural area have no function as a corridor for wildlife; this is likely to be as a result of intensive farming.

Cultural Asset

There is little green infrastructure performing the cultural asset function in the borough. The largest area is Chetwynd Deer Park. Areas such as Orelton Park, the playfields at Wellington Road, Donnington and the northern end of Telford Town

Park are also prominent.

Evaporative Cooling

All green infrastructure performs evaporative cooling, however, due to the presence of less green infrastructure in urban Telford there is less of this function performed there. However this is likely to be where it is most needed to address the urban heat island effect.

Flow reduction through Surface Roughness

There is a marked difference in the amount of green infrastructure performing this function between the urban area and the rural area. North east Telford, the Wrekin Hill, Ironbridge Gorge and Telford Town Park all have significant concentration of spaces fulfilling this function.

Food Production

This function is predominantly performed in the rural area; with pockets of performance in the urban area most likely to be allotments & community garden sites.

Green Travel Route

There is a relatively even performance of the function of green travel route across the borough, with the exception of a patch in the middle of the rural area around the Weald Moors.

Ground Stabilisation

Green infrastructure which is performing ground stabilisation is concentrated around the steepest slopes in the borough, the Wrekin Hill and in the Ironbridge Gorge area. Stabilisation also stands out along north south corridors following the lengths of rivers and streams.

Habitat for Wildlife

The rural area provides a considerable habitat for wildlife. The urban areas of Telford also provide many valuable habitats for wildlife however due to the approach to mapping adopted by the GIF this is not fully reflected in the map.

Heritage

Green infrastructure which is performing the heritage function is largely concentrated in the south of the borough around Ironbridge Gorge, though there are several other sites in the rural area.

Inaccessible Water Storage

Not mapped

Learning

Green infrastructure which is performing the learning function is mainly located within urban Telford. The two other main sites are Harper Adams University College and Hoo Farm.

Noise Absorption

Green infrastructure which is performing the noise absorption function is clustered around transport routes, such as roads and railways, and is therefore more common in urban Telford.

Pollutant Removal from Soil/Water

Not mapped

Recreation – Private

Private recreation most often occurs in private domestic gardens therefore this function is predominantly performed in urban Telford and Newport where there are large residential areas.

Recreation – Public

There is a stark contrast between green infrastructure which performs the public recreation function in the urban area and the rural area, with much greater provision in urban Telford.

Recreation – Public with Restrictions

Much of the green infrastructure which performs this function is agricultural land which has a Public Right of Way running through it or is accessible along the side of a field. There are several sites performing this function in the urban area, including that performed by allotments & community gardens.

Shading from the Sun

There are concentrations of green infrastructure performing this function in the urban area, and around the Wrekin hill.

Timber Production

There are several plantation woodlands which are apparent in the rural area as providing this function. The Wrekin Hill is also prominent.

Trapping Air Pollutants

Green infrastructure near roads, railways and other sources of pollution performs this function, as can been seen in urban Telford. Green infrastructure in the rural area can also be seen to perform in this way.

Water Conveyance

There is little green infrastructure in the borough which is performing water conveyance, as this function is mainly performed by water courses, these can be identified on this map – e.g. the River Severn.

Water Infiltration

Not mapped

Water Interception

Green infrastructure which performs the water interception function tends to be taller vegetation – such as trees and woodlands. Features such as the Wrekin Hill and other woodlands stand out in this map.

Wind Shelter

Green infrastructure which performs the function of wind shelter has to be tall enough to disrupt wind flows; therefore it is areas of woodlands that are prominent on this map.

Analysis by Need

The previous analysis has been concerned with understanding and discovering what green infrastructure can do and where it is doing it in the borough. This analysis is concerned with relating the functions of green infrastructure to where it is most needed.

Table 4 Shows the areas where each function is most needed

Function	Area where this function is needed most
Accessible Water Storage	Near areas where green infrastructure is performing multiple functions, near agricultural land
Aesthetic	Everywhere
Biofuels Production	Near areas of high energy use, or areas near a wood fuel supply chain
Carbon Storage	Everywhere
Corridor for Wildlife	Between existing habitats for wildlife
Cultural Asset	Near to where people live
Evaporative Cooling	Urban areas, and areas with high concentrations of vulnerable people
Flow Reduction through Surface Roughness	Upstream of previous flooding events
Food Production	High grade agricultural land

Green Travel Route	High density population areas, linking to schools and employment areas
Ground Stabilisation	Steep slopes
Habitat for Wildlife	Where existing populations thrive and surrounding areas
Heritage	Buffer of green infrastructure which currently perform heritage function
Inaccessible Water Storage	Upstream of previous flooding events
Learning	High density population areas and near educational establishments
Noise Absorption	Within 30m of roads and railways
Pollutant Removal from Soil/Water	High grade agricultural land, near roads and railways
Recreation – Public	Areas with low car ownership, areas with little public recreation function, areas with poor health
Recreation – Public with Restrictions	Areas with low car ownership, areas with little public recreation function, areas with poor health
Recreation – Private	Areas with low car ownership, areas with little public recreation function, areas with poor health
Shading from the Sun	Urban areas, areas with high proportion of vulnerable people, near education establishments
Timber Production	Near timber processing facilities
Trapping Air Pollutants	Near roads and railways, in high density population areas
Water Conveyance	Downstream of previous flooding events
Water Infiltration	Upstream of previous flooding events
Water Interception	Upstream of previous flooding events
Wind Shelter	Areas of high wind speeds

Themes

The purpose of this section is to identify how green infrastructure can assist in addressing the strategic economic, social and environmental issues facing the borough.

The section has been organised into the following 6 themes:

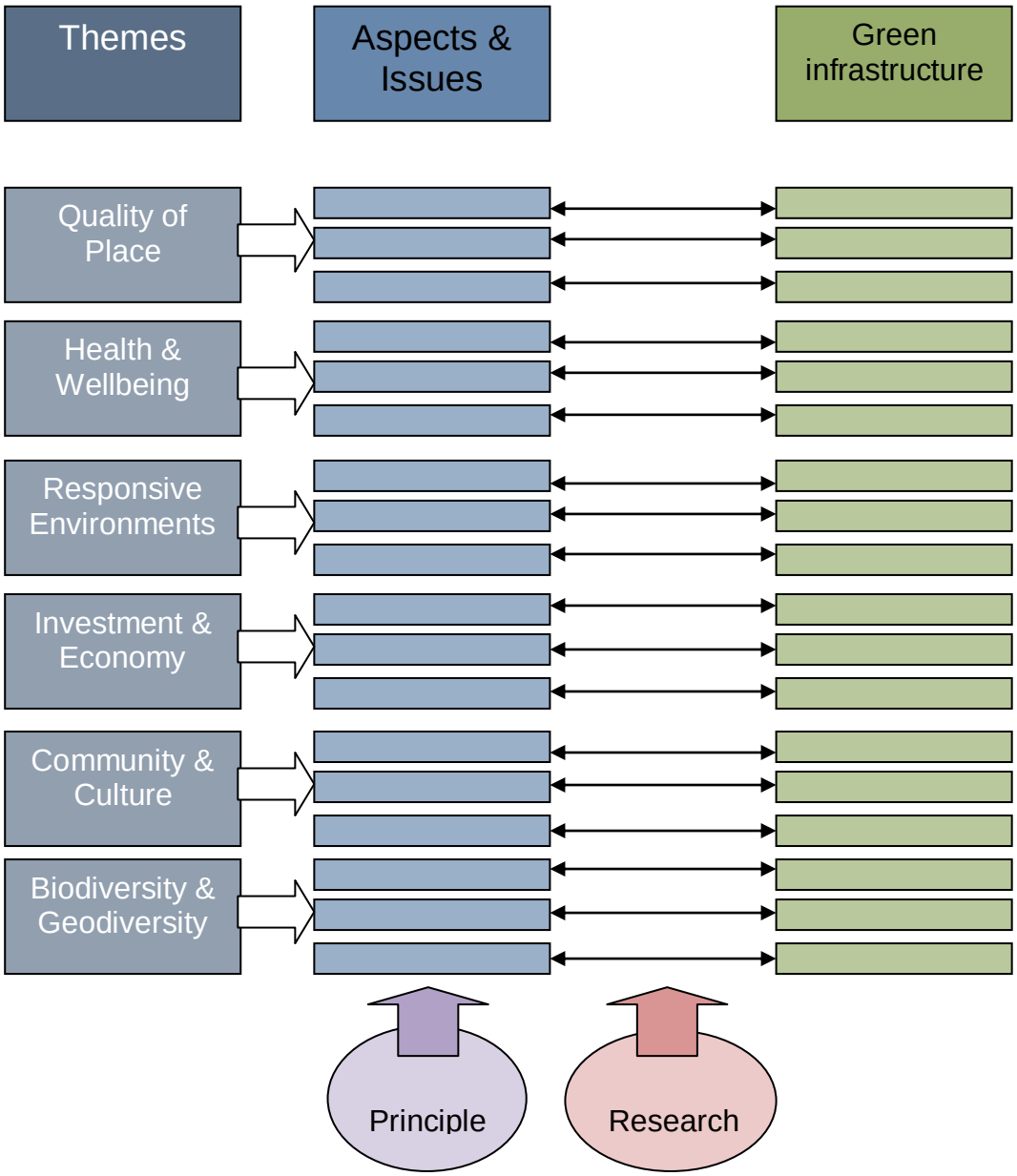
- Quality of Place
- Health & Wellbeing
- Responsive Environments
- Investment & Economy
- Community & Culture
- Biodiversity & Geodiversity

Each theme has been sub divided into a number of aspects and the issues related to each theme. A full explanation of the principles used to establish the issues is contained in Appendix 7.

Each theme has been explored to discover the relationship between the aspects/issues and green infrastructure – in particular, the role of green infrastructure in each aspect and the contribution of green infrastructure in addressing the issues based upon a literature review of the benefits of green infrastructure.

The 6 themes are not mutually exclusive i.e. similar issues can exist in different themes. For example, whilst tourism is an aspect of Investment & Economy it has close ties to the Community & Culture theme. These cross links are recognised on page 112 “recognising the links between the themes”.

Figure 8 How themes, aspects, issues and green infrastructure are related



Quality of Place

The Quality of Place theme is concerned with the physical aspects of places i.e. those features and attributes which provide the physical structure and context within which and through which an area is used and functions. It is concerned with the way in which the physical design of places – the layout, the form and appearance of its buildings and spaces affect and contribute to the performance of places in meeting the needs of a community and how a place looks, feels and is experienced.

It is concerned with the character of places including the way in which a place expresses and communicates the type of place it is as well as the way in which the physical quality of an area is an expression of the identity and values of a community.

Although this theme is concerned with the physical quality of an area, it is recognised that a place is much more than just the buildings and spaces; it is the product of the interaction of, and an amalgamation of many things.

For a geographic place to exist it must have a physical form – composed of man made and natural features (buildings, streets, open spaces etc.) but they are also created and shaped by the people and wildlife who use an area, by the type and range of functions which occur in an area and by the relationships between all of these things.

A place is also defined by the events which take place and have taken place in that location, by the individual and collective memories of the people who live, work and visit the location, by its heritage, by the way a place 'feels', sounds and smells (the way in which it affects our senses), by the meanings a place attaches to itself and the way in which an area communicates the sort of place it is – consciously or otherwise.

This theme is concerned with identifying the issues associated with Quality of Place and about identifying ways in which green infrastructure can assist in helping to

improve the function, appearance and experience of the borough and in creating successful sustainable places.

General Aspects and Issues

The Quality of Place theme has been subdivided into 5 aspects. These aspects are derived from a combination of key national best practice and government guidance. The following table provides a summary of the generic issues related to those aspects as identified by key national supporting documents.

Aspects of Quality of Place and Supporting Documents

	Supporting Documents: Issues					
Aspect	**Urban Design Compendium**[55]	**By Design Principles of Urban Design**[56]	**Princes Foundation Community Capital Framework**[57]	**Responsive Environments**[58]	**Planning Policy Statement 1**[59]**: Principles of Good Design**	**Building for Life**[60] **Question Number**
Providing for People	Places for people	Quality of the public realm. Continuity and Enclosure	Place-making Belonging Social exchange Access to services	Robustness	Create an environment where everyone can access and benefit from the full range of opportunities available to members of society.	1,3,13,15
Character	Make distinct places	Character	Native	Visual appropriateness Richness	Be integrated into the existing urban form and the natural and built environments	6,8,11,12,17
Connections & Circulation	Make connections	Ease of Movement Legibility	Interconnected Integrated	Permeability Legibility	Be integrated into the existing urban form and the natural and built environments	4,9,10,14

[55] English Partnerships & The Housing Corporation (2007) Urban Design Compendium http://www.homesandcommunities.co.uk/urban-design-compendium?page_id=&page=1
[56] DETR & CABE (2000) By Design: Urban Design in the Planning System, Towards Better Practice http://www.communities.gov.uk/documents/planningandbuilding/pdf/158490.pdf
[57] The Prince's Foundation for the Built Environment (2011) Community Capital Framework http://www.princes-foundation.org/community-capital
[58] Bentley *et al*. (1985) Responsive Environments: A Manual for Designers
[59] HMSO (2005) Planning Policy Statement 1: Delivering Sustainable Development http://www.communities.gov.uk/publications/planningandbuilding/planningpolicystatement1
[60] CABE (2008) Building for Life http://webarchive.nationalarchives.gov.uk/20110107165544/http:/www.buildingforlife.org/

Building Uses & Building Types	Mix of buildings and tenure	Diversity	Mixed Diverse Proportional	Variety	Address the connections between people and places by considering the needs of people to access jobs and key services	2
Public Realm	Continuity and enclosure	Quality of the public realm	Place-making	Personalisation Robustness	Be integrated into the existing urban form and the natural and built environments	1,6 ,7,8

The relationship between aspects, issues and green infrastructure in Telford & Wrekin

The aspects contained in the theme have been assessed according to:

- Issues identified in national best practice and government guidance (see above; Supporting documents)
- A set of principles based on the concept of sustainability (information on these principles is provided in the Appendix 7)

The following table provides a summary of the local issues related to the aspects of Quality of Place and their relationship to green infrastructure. Appendix 8 provides the referenced justification behind the selection of these key issues.

Aspect	Issues	Green infrastructure role and contribution
Providing for People	Unequal access to public green infrastructure across the borough. Green infrastructure in certain areas of the borough is unwelcoming and unsafe Many areas of employment are only accessible by car	Providing green infrastructure features that can serve recreation and leisure needs e.g. spaces for both active and passive recreation and leisure – for all sectors of the population. The provision of green spaces which foster community cohesion e.g. village greens. Increasing the attractiveness and safety of routes.
Character	There is a lack of identity/character in certain areas of Telford. Development particularly within protected sites (e.g. World Heritage Site,	The use of greenery to reinforce local distinctiveness e.g. through the use of planting which shares a 'design language' with the local character. Respecting mature landscape features for their social meaning.

Aspect	Issues	Green infrastructure role and contribution
	Conservation Areas) must be visually appropriate. The correct type of green infrastructure must be employed in areas where it matches the wider character of an area. Little understanding of the varying aesthetic quality of green infrastructure.	Using planting to help create urban spaces e.g. avenue trees. Using planting to help an area be more legible, including the use of green infrastructure to enhance safe and attractive routes – to encourage more sustainable movement. Create local green spaces to reduce the need for people to travel to obtain the same experience.
Connections & Circulation	There is a lack of safe, accessible and connected networks of green infrastructure. Sustainable modes of transport are not encouraged by existing provision of green infrastructure.	Using planting to help an area be more legible, including the use of green infrastructure to enhance safe and attractive routes – to encourage more sustainable movement. Create local green spaces to reduce the need for people to travel to obtain the same experience.
Building Uses & Building Types	There is little visual delight or stimulation in the urban fabric. Social housing is often isolated or separated. There is a lack of local identity. There are high demands for development land.	The use of green infrastructure as an integral part of urban design – building green space and planting working together – ensuring that the built infrastructure and the green infrastructure are integrated and green infrastructure is not an afterthought.
Public Realm	The public realm does not promote social interaction. The use of space is	Green infrastructure to make public realm more useable by employing it for climatic benefits e.g. shade and

Aspect	Issues	Green infrastructure role and contribution
	inefficient.	shelter. Using green infrastructure to increase sense of place. Provision of and good inclusive access to recreation and leisure opportunities. Understanding that all sites are habitats.

Health & Wellbeing

Health is the correct functioning of a living being, it is defined as “a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity”[61]. Wellbeing is the mental health, happiness and general quality of life of living beings. The health and wellbeing of people is determined by many factors including genetic disposition, lifestyle, life choices and culture and the type of environment. This theme is concerned with identifying the issues associated with Health & Wellbeing and about identifying the ways in which green infrastructure can assist in helping to improve people’s health, encouraging healthy lifestyles and in supporting people’s wellbeing.

General Aspects and Issues

The Health & Wellbeing theme has been subdivided into 5 aspects. These aspects are derived from a combination of key national best practice and government guidance. The following table provides a summary of the generic issues related to those aspects as identified by key national supporting documents

[61] World Health Organisation (1948) definition of health
http://www.who.int/suggestions/faq/en/index.html

Aspects of Health & Wellbeing and Supporting Documents

	Supporting Documents: Issues			
Aspect	**NICE Guidelines Independent guidance on promoting good health**[62]	**Telford & Wrekin Joint Strategic Needs Assessment Assessment**[63]	**Healthy Lives, Healthy People**[64]**: Government Strategy (Long term vision for public health)**	**Other health related NHS literature**
General	Maintaining a healthy weight will improve health and reduce risk of disease.	Prevent unhealthy lifestyles through education. Lifestyle impact on quality of life. Need to use planning laws to reduce dependence on cars.	Quality of the environment – pollution, air quality, noise, availability of green spaces, transport, housing, access to good-quality food and social isolation all influence health.	Healthy lifestyle prevents disease. Education is vital for good health. The environment plays a role in shaping health and wellbeing.
Physical Health & Wellbeing	Recommend 30 minutes of moderate exercise on 5 days of the week or more. Promote sustainable travel. Enhance provision of green space.	Obesity identified as a priority health issue. Balance of diet and exercise. Tackling Cancer and Coronary Heart Disease will have the greatest impact on improving life expectancy.	Obesity rates are higher among some black and minority ethnic (BME) communities and in lower socioeconomic groups. Preventing disease can lead to economic savings to the NHS.	High levels of obesity. Lack of education on how to live healthy lifestyles. Patients recover faster if they can view greenery from hospital.

[62] NICE Guidelines (Published) http://www.nice.org.uk/guidance/index.jsp?action=byType&type=2&status=3
[63] Telford & Wrekin PCT (2009) Joint strategic Needs Assessment http://www.telford.nhs.uk/About-the-PCT/PublicationsBoard-Papers/Publications/
[64] HMSO (2010) Healthy Lives, Healthy People: Our strategy for public health in England http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_121941

	Supporting Documents: Issues			
Aspect	**NICE Guidelines Independent guidance on promoting good health**[62]	**Telford & Wrekin Joint Strategic Needs Assessment Assessment**[63]	**Healthy Lives, Healthy People**[64]**: Government Strategy (Long term vision for public health)**	**Other health related NHS literature**
Mental Health & Wellbeing	Depression is a key health issue.	Telford & Wrekin has a significantly higher proportion of the population on incapacity benefits for mental illness than the UK average.	Wellbeing is influenced by a wide range of factors – social, cultural, economic, psychological and environmental.	Tackling poor mental health could reduce our overall disease burden by nearly a quarter. The cost of mental health problems to the economy has been estimated at £105 billion.
Food & Nutrition	Balanced healthy diet and regular physical activity helps prevent disease.		Improve access to land so that people can grow their own food.	
Inequality	Ensuring disadvantaged groups have equal support for active lifestyles.	The prevalence of childhood obesity amongst 4-5 year olds is significantly higher than the national average in the most deprived quintiles.	Health inequalities between rich and poor have been getting progressively worse.	

The relationship between aspects, issues and green infrastructure in Telford & Wrekin

The aspects contained in the theme have been assessed according to:

- issues identified in national best practice and government guidance (see above; Supporting documents)
- a set of principles based on the concept of sustainability (information on these principles is provided in the Appendix 7)

The following table provides a summary of the local issues related to the aspects of Health and Wellbeing and their relationship to green infrastructure. Appendix 9 provides the referenced justification behind the selection of these key issues.

Aspect	Issues	Green infrastructure role and contribution
General	Many new town era residential areas of Telford are based on the American “Radburn” design. The Radburn concept was a "Town for the Motor Age"; it is very focused on movement around the town by car. High levels of green infrastructure in Telford & Wrekin.	People recover faster from illness and surgery in a hospital when given a view of green infrastructure, rather than seeing only the walls of adjoining buildings[65]. Green infrastructure has a beneficial effect on healing and humans in general. Green infrastructure can be used to promote healthier ways of travelling such as walking and cycling.
Physical Health & Wellbeing	High levels of obesity for all ages of the population. Particularly high levels of obesity in children.	Accessible green infrastructure can improve and increase physical activity – policy supports local green infrastructure provision providing local

[65] Ulrich, R. (1984) View through a window may influence recovery from surgery. Science **224** p420-1

Aspect	Issues	Green infrastructure role and contribution
	Many associated health issues arise from obesity e.g. joint issues, high blood pressure, & diabetes. High levels of death from cardiovascular disease and coronary heart disease. High costs to NHS from preventable physical diseases.	areas for physical exercise and sports[66]. A key way of reducing costs to the NHS is to tackle obesity before it takes hold on a person. Providing local green infrastructure and promoting the benefits of using it can help make financial savings for local health services. The Telford & Wrekin JSNA commits to improving existing cycle-ways and footpaths, leading to a more active population.
Mental Health & Wellbeing	Lack of local data on mental health. Almost half of all adults will experience at least one episode of depression during their lifetime. 1 in 4 people will experience some kind of mental health problem in the course of a year. In 2005, 27.7 million anti-depressant prescriptions were written in England, at a cost of	A Mind report found that 71% of respondents in a study reported decreased levels of depression following a walk in green space[67]. The more often a person visits urban open green spaces, the less often he or she will report stress-related illnesses[68]. A study of 96 children suffering from attention deficit disorder (ADD) found that the children experienced fewer problems if they had access to green space for play and the 'greener' the

[66] The National Institute for Health and Clinical Excellence (NICE) supports the creation of environments that encourage physical activity: NICE (2008) NICE public health guidance 8: Promoting and creating built or natural environments that encourage and support physical activity http://www.nice.org.uk/nicemedia/live/11917/38983/38983.pdf

[67] Mind (2007) Ecotherapy: The green agenda for mental health http://www.mind.org.uk/campaigns_and_issues/report_and_resources/835_ecotherapy

[68] Grahn & Stigsdotter (2003) Landscape planning and stress, *Urban Forestry and Urban Greening* **2**(1): 1-18

Aspect	Issues	Green infrastructure role and contribution
	£338 million to the public health service.	setting, the less severe the ADD symptoms[69]. NICE guidance highlights the mental health benefits to older people of led walks in the natural environment[70]. Public green infrastructure can improve community cohesion through local friends of groups and volunteer working parties.
Food & Nutrition	Need for greater education around food sources and healthy options. Lack of access to food production sites. High local demand for more allotment sites.	Green infrastructure is the perfect setting for learning about where food comes from. Growing fruit and vegetables encourages healthy eating habits and has complementary benefits in making people more active. Allotments & community gardens can improve social cohesion.
Inequality	Strong association between deprivation and poor health in Telford & Wrekin. Obesity is significantly worse in the most deprived areas.	Ensure that accessible, quality green infrastructure is provided in all areas of the borough. The range of types of green infrastructure means that provision can be made in all areas of the borough. This may mean different types in different areas, e.g. it may be more appropriate for green roofs and

[69] Taylor *et al*. (2001) Coping with ADD: The Surprising Connection to Green Play setting. *Environment and behaviour* **33** (1), p 54-77

[70] NICE (2008) NICE public health guidance 16: Occupational therapy interventions and physical activity interventions to promote the mental wellbeing of older people in primary care and residential care http://www.nice.org.uk/nicemedia/pdf/PH16Guidance.pdf

Aspect	Issues	Green infrastructure role and contribution
		street trees in urban areas where there is little space for large new parks.

Responsive Environments

The world is constantly changing; the climate changes, the earth, rivers and seas change. In recent years this change has become more marked. This may be due to manmade or natural reasons. To be able to continue to survive and live we have to be responsive to the environment. There is an increasing public awareness of human impact on the world's resources. For example, the impact of energy needs (fossil fuels, nuclear power and 'green' technologies). The impacts of climate change are wide ranging; in both scale and gravity. This theme is concerned with identifying the issues associated with a changing environment and about identifying the ways in which green infrastructure can assist in addressing those issues.

General Aspects and Issues

The Responsive Environments theme covers a broad range of aspects. These aspects are derived from a combination of key national best practice and government guidance. The following table provides a summary of the generic issues related to those aspects as identified by key national supporting documents.

Aspects of Responsive Environments and Supporting Documents

	Supporting Documents: Issues			
Aspect	**PPS1 supplement**[71]	**The Stern Review**[72]	**Telford & Wrekin Climate Change Strategy**[73]	**UKCIP projections**[74]
Water Management	Planning policies should reflect the increased risk of flooding.	Annual flood losses alone could increase from 0.1% of GDP today to 0.2 - 0.4% of GDP once the increase in temperatures reaches 3 or 4°C.	Increased intensity in winter rainfall. Green infrastructure provides a valuable drainage resource.	Decrease in net annual rainfall. During winter there is projected to be an increase in mean precipitation and storm events.
Land	Take a precautionary approach to risk, including the risk of increased instability.			Land stability is identified as a vulnerability.
Temperature	Climate change will exacerbate the temperature gradient that rises from the rural fringe and peaks in city centres	Rising intensity of heat events. Reduced need for heating. Heatwaves like in 2003, when 35,000 people died and agricultural losses reached $15 billion worldwide, will become more common.	Warmer, drier summers.	Warmer, drier summers.

[71] HMSO (2007) Planning Policy Statement: Planning and Climate Change, Supplement to Planning Policy Statement1 http://www.communities.gov.uk/publications/planningandbuilding/ppsclimatechange
[72] Stern, N. (2007) The Economics of Climate Change http://webarchive.nationalarchives.gov.uk/+/http:/www.hm-treasury.gov.uk/sternreview_index.htm
[73] Telford & Wrekin Council (2008) A Climate for Change http://www.telford.gov.uk/downloads/file/2371/a_climate_for_change
[74] Environmental Change Institute (2009) UKCP09: UK Climate Projections http://www.ukcip.org.uk/ukcp09/

	Supporting Documents: Issues			
Aspect	**PPS1 supplement**[71]	**The Stern Review**[72]	**Telford & Wrekin Climate Change Strategy**[73]	**UKCIP projections**[74]
Energy	Planning conditions and obligations should secure long-term maintenance of aspects of development required to mitigate climate change.	Mitigation is a highly productive investment. Action to prevent further deforestation would be relatively cheap compared with other types of mitigation.	Reducing the amount of climate change by reducing carbon footprints is a priority.	Mitigation is equally as important as adaptation. Measures to help reduce emissions may have other benefits such as saving money.

The relationship between aspects, issues and green infrastructure in Telford & Wrekin

The aspects contained in the theme have been assessed according to:

- the principles which underline national best practice and government guidance (see above; Supporting documents)
- a set of principles based on the concept of sustainability (information on these principles is provided in the Appendix 7)

The following table provides a summary of the local issues related to the aspects of Responsive Environments and their relationship to green infrastructure. Appendix 10 provides the referenced justification behind the selection of these key issues.

Aspect	Issues	Green infrastructure role and contribution
Water Management	Overall decrease in net annual rainfall which could lead to irrigation issues and drought. During winter there is projected to be an increase in mean precipitation leading to potential river flooding issues. Increase in storm events leading to potential surface water flooding	Green infrastructure is a natural flood defence and should be utilised as such. Flood plains and areas around rivers should be kept free from development so they can perform this function[75]. Woodlands and trees can also help prevent flooding by slowing the rate at which water reaches the ground through infiltration and interception[76]. Sustainable Urban Drainage Systems (SUDS) are methods used to try and manage water in an urban setting. SUDS are an attempt to replicate more natural

[75] Halcrow (2007) Telford & Wrekin Council: SFRA for Local Development Framework http://www.telford.gov.uk/downloads/file/1059/level_1_strategic_flood_risk_assessment_september_2007

[76] http://www.woodlandtrust.org.uk/en/moretrees-moregood/Documents/Trees-flooding.pdf

Aspect	Issues	Green infrastructure role and contribution
	issues High levels of impermeable surfacing in urban areas.	drainage patterns, they often contain green infrastructure[77]. In terms of sustaining a water supply green infrastructure provides a permeable surface which helps to sustain infiltration to aquifers recharges groundwater and maintains base flow in rivers.
Land	Increased rainfall could lead to an increased risk of subsidence and a greater risk of soil erosion and ground instability Since 2001 Telford & Wrekin Council has spent more than £16 million on the land instability issue.	Green infrastructure, particularly trees will reduce the intensity of the rain when it reaches the ground, act as a wind break and its roots help bind the soil together[78].
Temperature	Potential negative impact on public health due to increased temperatures: patients suffering from heat cramps, heat rash, heat exhaustion and increased mortality. Certain sections of the	Modelling work in Manchester has suggested that adding 10% green cover to built-up areas keeps surface temperatures at a 1961-1990 baseline level up until the 2080s high emissions scenario[79]. All green infrastructure evapotranspires, cooling the air around it. As temperatures

[77] CIRIA (2007) SUDS Manual http://www.ciria.org/service/AM/ContentManagerNet/MembersOnly.aspx?NavMenuID=845&ContentID=12339&DirectListComboInd=D

[78] Nisbet et al. (2004). A Guide to Using Woodland for Sediment Control. www.forestresearch.gov.uk/pdf/englandwoodlandforsedimentcontroljune04.pdf/$FILE/englandwoodlandforsedimentcontroljune04.pdf

[79] Gill et al. (2007) Adapting cities for climate change: the role of the green infrastructure. Built Environment, 33(1), 115-133.

Aspect	Issues	Green infrastructure role and contribution
	population are more vulnerable to heat stress than others (the elderly, the very young and those with chronic or severe illness).	increase this will become increasingly important. One large tree can put out 200 to 300 gallons of water on a summer day. Studies suggest that air conditioning demand can be reduced by up to 30 per cent through the effects of well placed trees[80]. Increased temperatures and frequency of heatwaves could also lead to water shortages and drought. This is important to note with regard to green infrastructure. If not properly irrigated, green infrastructure will not perform certain functions or will have reduced functionality, particularly with regards to the evaporative cooling function.
Energy	The shift to a low-carbon economy will bring economic opportunities and threats. The UK has committed to a target of producing 15% of its energy demands from renewable	The UK has committed to reduce its carbon emissions in line with the Climate Change Act (2008)[81]. Through schemes such as the Renewable Heat Incentive, sustainably managed woodlands could help support sustainable energy sources. Green infrastructure can be managed to ensure a regular local and therefore

[80] Department of Health (2011) Heatwave Plan for England: Protecting health and reducing harm from extreme heat and heatwaves http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_127235.pdf

[81] HMSO (2008) Climate Change Act http://www.legislation.gov.uk/ukpga/2008/27/contents

Aspect	Issues	Green infrastructure role and contribution
	energy sources by 2020.	sustainable supply of biofuels. Green roofs can help reduce the amount of energy needed to heat/cool buildings[82]. The annual value of carbon sequestration benefits for the West Midlands is: £88million for woodlands, £93,000 for wetlands, and £40,000 for peatlands[83].

[82] http://livingroofs.org/2010030776/green-roof-benefits/energycons.html
[83] Jacobs (2008) Valuing England's Terrestrial Ecosystem Services http://randd.defra.gov.uk/Document.aspx?Document=NR0108_7324_FRA.pdf

Investment & Economy

Economics is the process and the products of supply and demand. It is concerned with the production, provision, and consumption of products and services, and the processes involved in that provision. Investment is the name for the time, energy, materials and money resources which are put in to the economic process. An area requires investment for it to work economically and succeed. Attracting investment and sustaining a local economy is vital to successful places.

This theme is concerned with identifying the issues associated with investment in Telford & Wrekin and the economics of the borough, and about identifying the ways in which green infrastructure can assist in attracting investment and ensuring a successful economy.

General Aspects and Issues

The Investment & Economy theme covers a broad range of aspects. These aspects are derived from a combination of key national best practice and government guidance. The following table provides a summary of the generic issues related to those aspects as identified by key national supporting documents.

Aspects of Investment & Economy and Supporting Documents

	Supporting Documents: Issues		
Aspect	**Telford & Wrekin Economic Assessment**[84]	**Telford & Wrekin Annual Monitoring Report**[85]	**www.investintelford.co.uk**
Transport	The ability to get around is limited by the bus service, which is considered to be poor.		Telford is well served by the M54. Most transport links are by road.
Employment & Industry	At September 2010, the local unemployment rate was around 8.5%.	Since 2006 69% of employment development has been on previously developed land.	As new residents move to Telford & Wrekin there will be a need for increased investment in jobs.
Planning & Land	Borough Towns Initiative and the Building Schools for the Future programme created up to 800 construction jobs. The Southwater redevelopment scheme is estimated to create 4,000 new jobs.	There are 227 hectares of land with approval for employment development, and 524 hectares of land with approval for residential development.	
Population & Housing	Population of Telford & Wrekin is growing faster than any other area in the region. Housing completions have been decreasing.	Housing completions are still being adversely affected by the national deterioration in the housing market.	
Tourism	Telford International Centre is the 5th largest facility of its type in the UK. The borough's tourism assets are not always connected together to realise their full potential.		Ironbridge is the commercial heart of the World Heritage Site.

[84] Telford & Wrekin Council (2011) Telford & Wrekin Local Economic Assessment http://www.investintelford.co.uk/about-telford/economy
[85] Telford & Wrekin Council (2010) Annual Monitoring Report 2010
http://www.telford.gov.uk/info/1004/planning_policy/352/local_development_framework_ldf/7

	Supporting Documents: Issues		
Aspect	**Telford & Wrekin Economic Assessment**[84]	**Telford & Wrekin Annual Monitoring Report**[85]	**www.investintelford.co.uk**
Education	The Ironbridge Gorge Museums Trust runs educational programmes. The Severn Gorge Countryside Trust and the Greenwood Trust run green infrastructure and natural environment related educational programmes.		Harper Adams is an internationally renowned university for agriculture and farming.

The relationship between aspects and issues and green infrastructure in Telford & Wrekin

The aspects contained in the theme have been assessed according to:

- the principles which underline national best practice and government guidance (see above; Supporting documents)
- a set of principles based on the concept of sustainability (information on these principles is provided in the Appendix 7)

The following table provides a summary of the local issues related to the aspects of Investment and Economy and their relationship to green infrastructure. Appendix 11 provides the referenced justification behind the selection of these key issues.

Aspect	Issues	Green infrastructure role and contribution
Transport	Telford & Wrekin has lower than the national and regional average household car ownership. The local bus service is considered to be poor. The Local Transport Plan identifies a need for more sustainable forms of transport.	Green infrastructure can provide an attractive setting for sustainable travel such as cycling and walking. Trees can also mitigate the effects of road and rail transport through reducing the impacts of noise and air pollution. Canals and waterways can be used as a transport resource.
Employment & Industry	Several large industrial estates, including Halesfield, Stafford Park and Hortonwood. Many industrial estates have large expanses of	Green infrastructure provides an attractive environment which supports and complements major development schemes that create jobs and enhance the economy. Over 35% of companies relocating to the South West of England

Aspect	Issues	Green infrastructure role and contribution
	green infrastructure land; this is to provide potential room for the future expansion of the industrial building within it if needed. Unemployment is highest amongst 16-24 years old. Population increases will lead to increased demand for employment.	quoted environmental attractiveness as a key reason for their move[86].
Planning & Land	There is a significant amount of undeveloped land that was intended for housing, employment and other types of development in the New Town era. Much of this land has planning permission to be developed under powers given by the New Towns Act (1981)[87]. There is a lack of appreciation or understanding of the function green infrastructure is or could	Nearly all development land is green infrastructure before it is developed (existing buildings and hard standing are the only exception). An attractive surrounding environment will add value to the surrounding property, both commercial and residential, consequently increasing tax yield to maintain public services[88].

[86] Gripaios *et al*. (1997) The Role of Inward Investment in Urban Economic Development: The Cases of Bristol, Cardiff and Plymouth: http://usj.sagepub.com/content/34/4/579.abstract
[87] HMSO (1981) New Towns Act http://www.legislation.gov.uk/ukpga/1981/64/contents
[88] CABE (2005) Does money grow on trees? http://webarchive.nationalarchives.gov.uk/20110118095356/http://www.cabe.org.uk/files/does-money-grow-on-trees.pdf

Aspect	Issues	Green infrastructure role and contribution
	be performing. Development sites are often left as green infrastructure until they are to be developed.	
Population & Housing	The population of the UK is growing, in Telford and Wrekin the population is forecast to increase to 206,600 people by 2026. In the future the population will 'age', the proportion of the older population will be increasingly become greater relative to other age groups.	Properties that directly overlook a park are valued at around 5% to 7% above an identical property in the same market area. Areas with easy access to green infrastructure are more popular with local residents, as shown by higher house prices. An ageing population will need access to green space to stay fit, active and healthy.
Tourism	Ironbridge Gorge World Heritage Site is the most significant tourist attraction in the borough. The tourism industry is estimated to support 3,629 jobs in Telford & Wrekin. The borough's tourism assets are not always connected together to realise their full potential.	40% of employment in tourism depends on high a quality environment[89]. A key component of the Ironbridge Gorge is its surrounding green infrastructure which provides a setting for the World Heritage Site.

[89] The National Trust (2005) Policy from Practice: Tourism http://www.nationaltrust.org.uk/main/w-east_midlands-tourism_policy.pdf

Aspect	Issues	Green infrastructure role and contribution
	Cultural tourism growth areas include festivals, conferences and events.	
Education	The Local Economic Assessment identifies that heritage industries such as the Ironbridge Gorge Museums Trust and the Telford Steam Railway find it hard to recruit workers with traditional skills.	Green infrastructure needs planning, maintenance and management; all of these areas require the employment of skilled professionals. Green infrastructure can provide a setting for learning new “green” skills such as forestry management.

Community & Culture

The term ‘community’ in this document means a group of people with a collective identity or common heritage, within or identifiable with a defined physical area. For example, Wellington has an identifiable ‘Asian community’. ‘Culture’ is used to mean the things we do for leisure, recreation and entertainment as well as for our individual and collective social, intellectual, emotional and religious needs and purposes. It is concerned with the things we do which express our values and how we communicate who and what we are as a community and place.

This theme is concerned with identifying the issues associated with Community & Culture and about identifying the ways in which green infrastructure can support social cohesion and a thriving cultural offering.

General Aspects and Issues

The Community & Culture theme covers a broad range of aspects. These aspects are derived from a combination of key national best practice and government guidance. The following table provides a summary of the generic issues related to those aspects as identified by key national supporting documents.

Aspects of Community & Culture and Supporting Documents

	Supporting Documents: Issues			
Aspect	**Cultural Strategy**[90]	**The West Midlands Visitor Economy Strategy**[91]	**Attending Heritage Sites: A Report for English Heritage**[92]	**DCMS Taking Part: The National Survey of Culture, Leisure & Sport**[93]
People	Culture is about sense of identity (individual/ society) the connections we feel with where we live and the people we live among.	Locally distinctive events can enhance sense of place and sense of community.	Participation in cultural activities will increase community cohesion.	
History, Heritage and Knowledge	Ironbridge Gorge is one of only 28 World Heritage Sites in the UK and attracts between 750,000 and 1 million leisure visitors each year. The Ironbridge Gorge World Heritage Festival is held in September each year.	Culture and heritage is a growth market priority for the visitor economy in the West Midlands. Heritage has wide market appeal	There is a strong relationship between access to a vehicle owned by the household and attendance at heritage sites. Being taken to a heritage site as a child has a much larger affect on attendance as an adult than any other factor	Annual attendance at historic sites is lower in the West Midlands than the national average. People from rural areas are more likely to visit heritage sites than those living in urban areas.

[90] Shropshire Council and Telford & Wrekin Council (2009) Evolution, Revolution and Innovation: A Cultural Strategy for Shropshire and Telford & Wrekin 2009 – 2014 http://www.telford.gov.uk/info/200006/arts_and_entertainment/644/arts_development/2

[91] West Midlands Regional Observatory (2008) West Midlands Visitor Economy Strategy http://www.advantagewm.co.uk/site-tools/download.aspx?id=tcm:9-1325&file=/Images/VES270608_tcm9-1325.pdf&title=West Midlands Visitor Economy Strategy 2008

[92] Centre for Economics and Business Research (2007) Attending Heritage Sites http://hc.english-heritage.org.uk/content/pub/Technical_report_quantified_Analysis_Taking_Part_survey_tagged.pdf

[93] DCMS (2010-2012) Taking Part Survey http://www.culture.gov.uk/what_we_do/research_and_statistics/4828.aspx

	Supporting Documents: Issues			
Aspect	**Cultural Strategy**[90]	**The West Midlands Visitor Economy Strategy**[91]	**Attending Heritage Sites: A Report for English Heritage**[92]	**DCMS Taking Part: The National Survey of Culture, Leisure & Sport**[93]
Arts & Entertainment	Rural isolation poses deprivation issues in terms of access to arts and cultural opportunities. Celebrate & use green environment through the countryside, parks, cultural programmes and education.	The Ironbridge Gorge World Heritage Site has been identified as an area where investment in the creative industries will pay dividends.		There is a strong relationship between cultural engagement and deprivation. West Midlands has the lowest engagement with the arts nationally.
Sports & Leisure	Rural isolation poses deprivation issues, in terms of provision of sports facilities. Telford & Wrekin has world-class sporting facilities such as Lilleshall National Sports Centre. 19.9% of adults regularly participate in sport in the borough.	The visitor economy can create demand for new, sports and leisure facilities. Department for Culture, Media and Sport has allocated £2.4 million to the West Midlands Cultural Olympiad Programme.		The relationship between sports participation and deprivation is not shown to be statistically significant.

The relationship between aspects and issues and green infrastructure in Telford & Wrekin

The aspects contained in the theme have been assessed according to:

- the principles which underline national best practice and government guidance (see above; Supporting documents)
- a set of principles based on the concept of sustainability (information on these principles is provided in the Appendix 7)

The following table provides a summary of the local issues related to the aspects of Community and Culture and their relationship to green infrastructure. Appendix 12 provides the referenced justification behind the selection of these key issues.

Aspect	Issues	Green infrastructure role and contribution
People	A stronger 'green' conscience is emerging as people become more aware of the impact of climate change and the need to protect the environment, there is scope to embrace this as part of the cultural agenda. Ageing population. Currently, 84% of the population of the borough live in urban Telford, though this is only 28% of the land area of the borough. Out of 108 Super Output Areas[94] in the borough, 14 are	Green infrastructure can provide a link with nature close to people's homes, enhancing their green conscience and encouraging more sustainable lifestyles. The majority of people live in urban areas, more creative ways of greening urban settlements can ensure that their contact with green infrastructure is maintained (e.g. green roofs/walls, street trees etc.). Different types of green infrastructure can appeal to different age groups. Quality

[94] Super Output Areas are a set of geographical areas developed following the 2001 census. They are often used as a way of spatially presenting data for an area. They are consistent in population size

Aspect	Issues	Green infrastructure role and contribution
	in the top 10% most deprived nationally, conversely, 15 Super Output Areas are in the 20% least deprived nationally. Parks and green spaces are very important to children and young people – these are where the great majority of children say they play and want to play.	public space can provide an arena for different age groups to meet. Green infrastructure provision can help to bridge the gap between deprived areas and affluent areas by the ability of landscape to trigger memories of something familiar; it helps facilitate a sense of belonging[95].
History, Heritage & Knowledge	Telford & Wrekin has an established character as a "green" area through previous concepts such as the 'Forest City' and the Green Network designation, both of which have become deeply rooted in the consciousness of the town. The culture of Newport and the rural area is deeply intertwined with their economic base of agriculture and food production. The Ironbridge Gorge is one of only 28 World Heritage Sites in the UK and the only one in the sub region. The Ironbridge Gorge World	A key heritage link is the landscape around us. Many of Telford's former pitmounds are now green infrastructure features. Other examples of heritage green infrastructure are heritage parks and ancient woodland. Many historical features such as geological strata are set within green infrastructure. The heritage of a place is closely linked with its green infrastructure.

and not liable to change (as electoral wards may):
http://www.idea.gov.uk/idk/core/page.do?pageId=7175806

[95] CABE (2010) Community Green: Using Local Spaces to Tackle Inequality and Improve Health
http://www.openspace.eca.ac.uk/pdf/appendixf/OPENspacewebsite_APPENDIX_F_resource_2.pdf

Aspect	Issues	Green infrastructure role and contribution
	Heritage Site is striving to be seen as a green tourism leader and one of the world's most sustainable World Heritage Sites.	
Arts & Entertainment	The Ironbridge Gorge World Heritage Site Festival is held in September each year. Events and festivals are a significant driver in the growth of the short breaks market. There has been growth in this area over the last 10 years in the West Midlands. Telford Town Park is also the venue for a host of events throughout the year; the Town Park Strategic Framework[96] aims to enhance the cultural and art offerings of the Town Park.	Green infrastructure can provide a setting for cultural events and festivals (such as music festivals/Ironbridge World Heritage festival).
Sports & Leisure	Telford & Wrekin has a Public Rights of Way network that contains over 900 individual routes, totalling over 360 kilometres of path. There are a number of sports pitches and sites across the borough. There are highly regarded local	Green infrastructure can provide the setting for formal and informal sports and leisure. Green infrastructure is the setting for most outdoor sports. It provides the ground on which the sport can be played, and an attractive setting. An attractive green setting for

[96] Scott Wilson for Telford & Wrekin Council (2006) Telford Town Park Strategic Framework

Aspect	Issues	Green infrastructure role and contribution
	BMX teams but facilities are poor. Ensuring opportunities associated with the London 2012 Olympics are exploited. There are individuals and groups in society who have perceptions that public spaces and public transport may be unsafe (particularly in the evenings).	recreation and leisure will attract move visitors to an area.

Biodiversity & Geodiversity

Biodiversity is the word which is used to describe the variety of all the different forms of life other than human beings. This includes different species of plants, animals and the habitats that they live in i.e. all forms of fauna and flora. Geodiversity is the word which is used to describe the variety, condition and quality and distribution of geology and soils.

Biodiversity & Geodiversity provide us with the essentials of life, such as clean air and water, they form part of the essential matrix of human existence e.g. bees require a habitat in which to survive; without bees many of our essential plants would not be pollinated and without pollination we would not have the plants which are necessary for human survival. The borough's green infrastructure is the resource which supports and delivers these services (sometimes called '*ecosystem services*').

It should be noted that all green infrastructure has a role in helping preserve biodiversity, not just protected or unique habitats. The level and stability of these services generally improve with increasing levels of biodiversity which is why it is important that the borough manages its green infrastructure carefully; protecting, enhancing and creating it where necessary.

This theme is concerned with identifying the issues associated with Biodiversity & Geodiversity and about identifying the ways in which green infrastructure can assist in ensuring the stable delivery of ecosystem services.

General Aspects and Issues

The Biodiversity & Geodiversity theme covers a broad range of aspects. These aspects are derived from a combination of key national best practice and government guidance. The following table provides a summary of the generic issues related to those aspects as identified by key national supporting documents.

Aspects of Biodiversity & Geodiversity and Supporting Documents

	Supporting Documents: Issues					
Aspect	**England Biodiversity Strategy**[97]	**PPS9 – Biodiversity & Geological Conservation**[98]	**Making Space for Nature- The Lawton Review**[99]	**Conservation of Habitats & Species Regulations 2010**[100]	**Natural Environment & Rural Communities Act 2006**[101]	**Natural Environment White Paper**[102]
Designated Sites	Improve the condition of SSSIs.	Development should not negatively impact upon designated sites (directly or indirectly).	England's Wildlife sites: More, Bigger, Better.	Protection of European sites, Natura 2000 – SACs and SPAs.	Local Authority has biodiversity duty to protect and enhance biodiversity.	Nature Improvement Areas – enhance and reconnect nature.
Designated Landscapes	Continue to protect and enhance Nature Improvement Areas.	Continue to protect and enhance AONBs.	Managing protected landscapes. Think BIG report.		Champion the benefits of biodiversity within local partnerships.	Local Nature Partnerships. Landscape scale planning.
Protected & Priority Species & Habitats	Protect & enhance the quality of existing priority	Are a material consideration in planning. Development	Improve the quality of current Wildlife Sites by better habitat	Article 12 of the Habitats Directive contains a	Participate actively in Local Biodiversity Partnerships and	Biodiversity Offsetting

[97] DEFRA (2002) Working with the grain of nature: a biodiversity strategy for England http://www.defra.gov.uk/publications/2011/03/29/pb7718-biodiversity/
[98] HMSO (2005) Planning Policy Statement 9: Biodiversity and Geological Conservation http://www.communities.gov.uk/publications/planningandbuilding/pps9
[99] DEFRA (2010) Making Space for Nature: A review of England's Wildlife Sites and Ecological Network http://www.defra.gov.uk/news/2010/09/24/nature-news/
[100] HMSO (2010) The Conservation of Habitats and Species Regulations 2010 http://www.legislation.gov.uk/uksi/2010/490/contents/made
[101] HMSO (2006) Natural Environment and Rural Communities Act http://www.legislation.gov.uk/ukpga/2006/16/contents
[102] DEFRA (2011) The Natural Choice: Securing the Value of Nature http://www.defra.gov.uk/environment/natural/whitepaper/

	Supporting Documents: Issues					
Aspect	**England Biodiversity Strategy[97]**	**PPS9 – Biodiversity & Geological Conservation[98]**	**Making Space for Nature- The Lawton Review[99]**	**Conservation of Habitats & Species Regulations 2010[100]**	**Natural Environment & Rural Communities Act 2006[101]**	**Natural Environment White Paper[102]**
	habitat. Increase the size and create new areas of habitat. Prevent extinctions.	should not only avoid and mitigate harm but seek ways to enhance & restore biodiversity.	management. Reduce the pressure on wildlife by improving the wider environment.	range of prohibitions seeking to protect certain species (European Protected Species).	assist with the delivery of Local Biodiversity Action Plans.	
Ecological Networks	Enhance ecological connections between, or join up, existing areas of priority habitat. Improve knowledge of ecological networks.	Developments should avoid habitat fragmentation and isolation. Existing networks, where possible, should be strengthened by, or integrated within, new developments.	A resilient network. Enhance connections between sites, through corridors or through 'stepping stones'. Ecological restoration Zones		Local Authority has duty to protect and enhance biodiversity.	"Think Big". Landscape scale conservation. Establish coherent ecological networks. Whole ecosystem approach.
People & Nature	Engage more people to raise awareness. Increase the number of people taking				Supports access to nature and understanding of the natural world within formal and informal	Connect through health and education. Better access to nature. More voluntary

	Supporting Documents: Issues					
Aspect	**England Biodiversity Strategy[97]**	**PPS9 – Biodiversity & Geological Conservation[98]**	**Making Space for Nature- The Lawton Review[99]**	**Conservation of Habitats & Species Regulations 2010[100]**	**Natural Environment & Rural Communities Act 2006[101]**	**Natural Environment White Paper[102]**
	positive action.				education and community engagement.	action.
Resilient Ecosystems	A healthy, functioning ecosystem is important. Need to restore ecological processes. Allow adaptation to climate change.	Embedding natural environment into Local Development Frameworks and Planning Decisions.	Identify and protect ecosystem services. Make space for nature.		Protect and enhance biodiversity. Ensure the conservation of biodiversity is incorporated into all relevant corporate strategies, plans and programmes.	Move from net biodiversity loss to net gain. Local Nature Partnerships. Whole Ecosystem approach

The relationship between aspects and issues and green infrastructure in Telford & Wrekin

The aspects contained in the theme have been assessed according to:

- the principles which underline national best practice and government guidance (see above; Supporting documents)
- a set of principles based on the concept of sustainability (information on these principles is provided in the Appendix 7)

The following table provides a summary of the local issues related to the aspects of Biodiversity and Geodiversity and their relationship to green infrastructure. Appendix 13 provides the referenced justification behind the selection of these key issues.

Aspect	Issues	Green infrastructure role and contribution
Designated Sites	Management of visitor pressure at sites. Bringing all sites into favourable management. Different approaches needed for urban and rural sites. Prioritise funding and resources effectively. Ensuring designation of key nature and biodiversity sites. Local desire for new Local Nature Reserves.	Green infrastructure provides the setting for key nature and biodiversity sites and these areas are often designated to remain as green infrastructure, with protection provided by policy. Different types of green infrastructure are more likely to be designated due to their rich biodiversity (for example natural and semi natural habitats including; grassland, heathland, moorland, scrubland is likely to be more biodiverse than outdoor sports facilities).
Designated Landscapes	Conserve and enhance the AONB. Management of visitor	Green infrastructure is integral to the quality of the AONB. All designated landscapes owe their

Aspect	Issues	Green infrastructure role and contribution
	pressure at sites. Implement management plans for sites.	character to some extent to the green infrastructure and that of their surroundings. Green infrastructure is particularly a prominent feature of natural and rural landscapes.
Protected & Priority Species & Habitats	Promote and implement Shropshire Biodiversity Action Plan. Habitat loss from development. Protected species often present on sites which are likely to be developed. Need for improved knowledge and data in decision making. Lack of quality data to show location of protected species and habitats.	Green infrastructure provides habitats for protected and priority species – they are interconnected. Green infrastructure can be used as a buffer for certain types of development to conserve and protect priority species and habitats. Green infrastructure can be used to avoid and mitigate impacts of development on biodiversity. Provision of green infrastructure can enhance opportunities for protected species to live and breed in an area. Green infrastructure can be integrated into a development in a certain way (design, choice of type etc.) to ensure protected species are catered for.
Ecological Networks	Isolation of sites in urban areas. Urban areas are by their nature harsh environments for certain species, this is exacerbated by fragmentation. Lack of coherent and	Creating more and enhancing existing pockets of green infrastructure in urban areas can ensure that species are not evicted from towns and cities[103]. Provision of green infrastructure can create and enhance ecological networks. Different types of green infrastructure

[103] Lawton (2010) Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf

Aspect	Issues	Green infrastructure role and contribution
	resilient ecological networks across Telford & Wrekin. Need for existing sites to be restored and new sites to be created to enhance the network. Development should be integrated within the existing ecological network without causing fragmentation or isolation of habitats; where possible the network should be repaired and strengthened.	will provide a corridor for a widely different range of species. Green infrastructure can provide corridors and stepping stones for species to move and migrate, thus increasing their range and abundance.
People & Nature	Exploit opportunities to use existing volunteer groups and networks. Reliance on local recorders to produce species records and survey data. Need for improved data sharing. Need for more “green” education.	Education of people about the importance of green infrastructure and associated biodiversity will help protect the resource. Biodiversity and green infrastructure have a vital role to play in enhancing wellbeing and quality of life for the people in the borough.
Resilient Ecosystems	Need to acknowledge the economic value of ecosystems. Enhance ecological networks particularly within	Conservation of biodiversity must be built into all relevant strategies and plans to ensure ecosystem services continue to be provided. Caroline Spelman MP is quoted as

Aspect	Issues	Green infrastructure role and contribution
	urban areas. Threat of climate change – allowance needs to be made to enable species to migrate northwards and upwards. Ecosystems rely on all green infrastructure, not just designated sites. Habitats may change as the climate changes. Greater emphasis should be placed on landscape scale planning.	saying that bees alone are worth £440 billion a year to the UK economy[104]. Although biodiversity does not often have an obvious economic value, it provides a variety of ecosystem services without which life could not be sustained. Green infrastructure provision can ensure that new habitats are provided northwards and upwards for species which are suffering habitat loss due to climate change and increased wider landscape permeability.

[104] http://www.bbc.co.uk/news/science-environment-11642538

Recognising the Links between Themes

The 6 themes are not mutually exclusive and that issues highlighted in one theme may be equally relevant to another. Table 5 shows some of the key linkages between the different themes.

Table 5 Issues which link the themes

	Aspects	Quality of Place	Health & Wellbeing	Responsive Environments	Investment & Economy	Community & culture	Biodiversity & Geodiversity
Quality of Place	Providing for People		■			■	
	Character				■		
	Connections & Circulation			■			
	Building Uses & building Types						
	Public Realm		■			■	
Health & Wellbeing	General						
	Physical Health & Wellbeing	■				■	
	Mental Health & Wellbeing	■					■
	Food & Nutrition			■	■		
	Inequality					■	
Responsive & Environments	Water Management				■		■
	Land				■		
	Temperature		■				
	Energy				■		
	Waste						
Investment Economy	Transport		■	■			
	Employment & Industry					■	
	Planning & Land	■					■
	Population & Housing					■	
	Tourism	■					

	Aspects	Quality of Place	Health & Wellbeing	Responsive Environments	Investment & Economy	Community & culture	Biodiversity & Geodiversity
	Education					■	
Community & culture	People	■					
	History, Heritage & Knowledge	■			■		
	Arts & Entertainment		■				
	Sports & Leisure		■		■		
Biodiversity & Geodiversity	Designated Sites	■					
	Designated Landscapes	■					
	Protected & Priority Species & Habitats			■			
	Ecological Networks		■				
	People & Nature		■			■	
	Resilient Ecosystems			■			

Part C: Planning Implementation

Introduction

The existence of green infrastructure is the result of the deliberate and accidental actions (and inaction) of individuals and organisations e.g. Private home owners, community groups, local authorities, wildlife groups, highway engineers etc. The increase or decrease, enhancement, repair or management of green infrastructure is determined by an enormous range of human actions.

The aim of Part C: Planning Implementation is to describe the actions that can be taken to help coordinate and implement green infrastructure **through the planning process.**

Green Infrastructure Planning

The Telford & Wrekin Council Green Infrastructure Framework has identified the following ways in which we can strategically plan for green infrastructure.

Green Infrastructure Policies

Green Infrastructure policies within the Local Plan (Shaping Places).

Supplementary Planning Guidance/Supplementary Planning Document (SPD)

Supplementary information regarding the appropriate provision of green infrastructure to support green infrastructure planning policies including:

- *Strategic Green Infrastructure Plan*: providing information regarding green infrastructure of strategic significance based upon national, regional or borough criteria

- *Percentage green infrastructure obligations*: providing percentage requirements for the provision of green infrastructure on sites and in areas of the borough

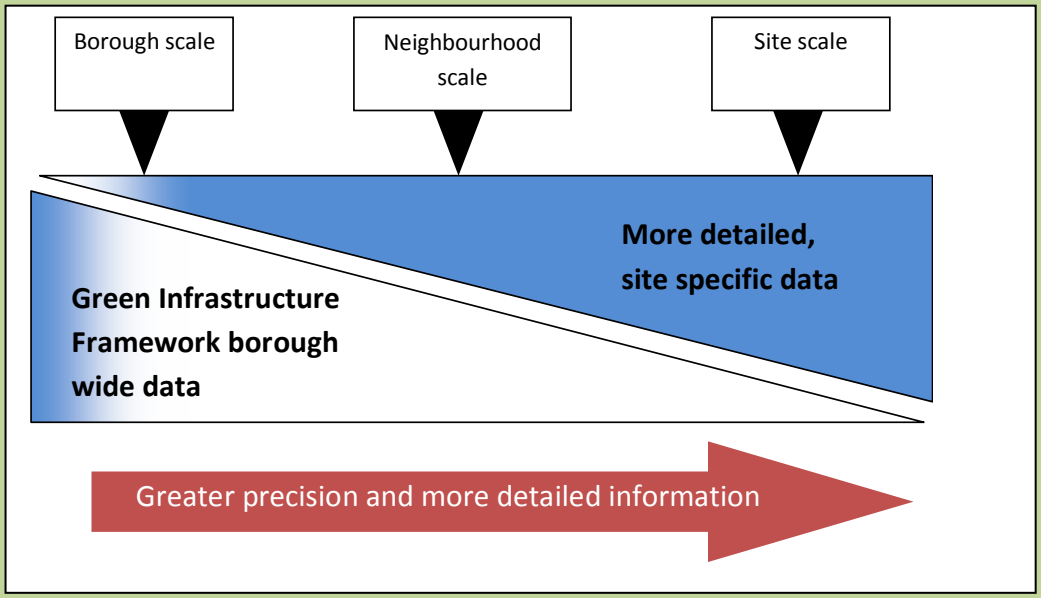
- *Performance Assessment test*: providing a method by which an area or site

can be interrogated to establish the type, amount and distribution of green infrastructure.

Performance Assessment is concerned with getting the most from our green infrastructure.

Optimising the performance (getting the most out) of green infrastructure not only maximizes what it can do but increases the benefits of green infrastructure for a local community – with increased likelihood of local 'ownership' (with the potential benefits of respect, local identity and community cohesion as well as the potential for reduced costs to the local authority).

The assessment of the performance of green infrastructure can be applied at different scales.



The purpose of the above diagram is to show how the performance assessment of green infrastructure requires increasingly greater precision and more detailed information at more detail scales.

Conclusions

The Green Infrastructure Framework Evidence & Analysis Document is a major component in the provision of an overall Green Infrastructure Framework. Its purpose has been to:

- Improve the understanding of what green infrastructure is and what it can do
- Explain what a Green Infrastructure Framework is and its purpose
- Provide a useful green infrastructure data base
- Provide an analysis of the existing green infrastructure
- Provide a description of how the planning process can help the provision of green infrastructure

The following table provides a summary of the objectives of the Green Infrastructure Framework and how they have been met in the Green Infrastructure Framework Evidence & Analysis Document.

Objective	How this has been met
To provide an overarching framework for the planning, design and management of strategic and local green infrastructure in the borough.	The information contained in Parts A and B is essential for the construction and design of the Framework. Part C provides a description of the methods by which the Framework can be achieved.
To help co-ordinate strategic/regional cross boundary green infrastructure areas e.g. The AONB, The Ironbridge Gorge World Heritage Site, the River Severn, the Shrewsbury and Newport Canal, National Cycle Ways and various Public Rights of Way.	The importance and profile of these strategic assets has been recognised within the document.

Objective	How this has been met
To assist the borough in responding to the challenges of a changing environment.	The benefits of using green infrastructure to address climate change issues has been described and highlighted.
To maximise the benefits of green infrastructure in both rural and urban environments.	The benefits of using a green infrastructure approach to address rural and urban issues has been recognised and encouraged.
To enable the planning and design of the built and natural environment to be approached in a joined up and holistic way.	The importance of integrating green infrastructure into all planning and design matters has been a key theme in the document.
To help achieve sustainable development.	The over arching principle of the Green Infrastructure Framework is sustainability.
To improve the contribution of green infrastructure in attracting and retaining investment.	This has been strongly recognized.
To embed a good understanding of green infrastructure and what it can do within the council.	The document has provided and continues to provide the ability to reinforce this understanding.
To be able to assess and measure the role and contribution of green infrastructure in a more structured and objective way.	The methodology recommended in Part C provides this assessment.
To apply green infrastructure in a more structured and objective way.	The document has provided clear direction in supporting this objective.

Objective	How this has been met
To help secure funding for the Green Infrastructure Framework actions including mechanisms to resource the long term management of both existing and new green infrastructure.	The document provides the secure information in support of funding.
To establish criteria which recognises the functions and value of green infrastructure at a strategic level in order to prioritise sites which are most vulnerable or in need of immediate action.	Part B provides an analysis of the types and functions of Green Infrastructure. The Performance Assessment (Part C) will address this further at a more site specific level.
To establish a governance model for monitoring and reporting on green infrastructure linked to corporate annual reporting and performance management.	The document helps to support this objective.
To ensure the council can lead by example in promoting the benefits of green infrastructure.	The document has provided and continues to provide the ability to embed this understanding.
To ensure efficient and effective delivery of the framework through partnership working.	The document helps to support this objective.

Green Infrastructure Framework

Evidence & Analysis Appendices

a co-operative council

Telford & Wrekin COUNCIL

Appendix 1: Stakeholders in the Telford & Wrekin Green Infrastructure Framework

External organisations:

BESST (Business Environmental Support Scheme for Telford)

CABE space (part of Design Council)

Community Safety (West Mercia Police)

English Heritage

Environment Agency

Greenwoods Trust

Homes and Communities Agency

Ironbridge Gorge Museums Trust

Local media

Marches Local Enterprise Partnership

Natural England

Severn Gorge Countryside Trust

Shropshire Chamber of Commerce

Shropshire Council

Shropshire Wildlife Trust

Small Woods Association

South Staffordshire Council

South Telford Rights of Way Partnership

Sport England

Stafford Borough Council

Telford & Wrekin Council

Cabinet lead

Cabinet Members

Development Plans Steering Group

Telford & Wrekin Council Officers (directly involved with project)

Community Engagement, Equalities & Action Team

Corporate Finance Manager

Development Management Service Delivery Manager

Economic & Regeneration Team Leaders (Borough Towns)

Estates & Investments Manager

Green infrastructure Project Board Members

Highways & Transport Service Delivery Manager

Parks and Open Space Manager

Partnership & Performance Manager

Strategic Housing & Development Plans Service Delivery Manager

Town and Parish Council & Rural Specialist

Telford & Wrekin Council Officers (not directly involved with project)

Capital & Facilities Manager

Highways & Transport Service Delivery Manager

Leisure Facilities & Services Service Delivery Manager

Other

Telford & Wrekin Community Volunteer Service

Telford & Wrekin Parish Councils

Telford & Wrekin general public

Telford & Wrekin Local Strategic Partnership

Telford & Wrekin PCT/NHS

Telford &Wrekin user groups (e.g. friends of)

TWS (Telford & Wrekin Services) Contractors

Wrekin Housing Trust

Appendix 2: Typology Factsheets

Agricultural Land

Distinguishing Features

- Usually associated with food production (growing of crops and the rearing of animals)
- Often compromised of one single crop which is grown and cultivated annually, there may be rotation of crops leading to distinct annual variations
- Land may be under environmental stewardship schemes which ensure effective environmental management of agricultural land. This can include organic practices and wildlife sensitive farming
- Some environmental stewardship schemes promote public access, therefore access and recreation functions may be present on site
- Mainly consists of fields, which may include scattered trees and hedgerows
- The appearance of agricultural land will change seasonally, from bare ground post harvesting and ploughing, to fully grown crops. Appearance may also change if different crops are grown

OWNERSHIP: Predominantly private or landowner leased

ACCESS: Limited public access some public rights of way

LANDSCAPE PATTERN: Variable size, shape and form; can be undulating or level. Predominantly rectangular with strong landscape pattern

MANAGEMENT: Intensive with seasonal variations. Fields may be managed in a rotational manner whereby a field is left fallow for one year

MISC: Occasional trees, hedgerows bare ground and hay bales

Allotments & Community Gardens

Distinguishing Features

- Usually associated with the cultivation of fruit and vegetables on a small scale
- Sites are made up of several smaller parcels of land which are individually managed but overseen by a committee of allotment holders and/or the local authority
- Individual allotment plots will have a different range of vegetation and some plots will have a wider species range than others
- Community gardens are sites that are managed by the local community
- Sites have value as a recreational resource, and as a space for learning about nature and food production
- Sites or individual parcels of land within sites will change in appearance seasonally. The site composition may change as ownership changes or a change of flora is introduced

OWNERSHIP: Predominantly council owned, plots are leased to individuals who manage the land within a set of guidelines

ACCESS: Limited to those with permission or keys to the site

LANDSCAPE PATTERN: Sites vary in size and shape but are usually split into a series of square plots, strong landscape pattern

MANAGEMENT: Each allotment is individually managed and management practices will vary, though overall site management will be overseen by a committee of allotment holders and/or the local authority

MISC: Occasional trees and hedgerows at the external boundaries of sites

Cemeteries, Churchyards & Burial Grounds

Distinguishing Features

- Areas which act as a resting place for the dead and quiet contemplation for the living
- Often attached to religious grounds and buildings or specifically designed space for burials near to urban areas
- Usually grassland with scattered trees, shrubs and flowers, cut flowers may be laid. Sites have maintained footpaths and benches
- Limited change over time, extra graves may be added but overall composition of the green infrastructure of the site is unlikely to change

OWNERSHIP: Usually council owned or on private church grounds

ACCESS: Publicly accessible though may be closed at night

LANDSCAPE PATTERN: Large expanses of grassland with rows of headstones creating structure. There are also likely to be clear boundaries to the site

MANAGEMENT: Intensive, grass is kept short and a formal feel is maintained

Incidental Green Space

Distinguishing Features

- Areas which have been left over after planning, and areas that have been left intentionally such as village greens or space used as a buffer for example roadside verges
- This type usually consists of mown grass
- Can be large or small parcels of land
- The intention of incidental green space is usually aesthetic but sometimes these areas can look tired and monotonous due to lack of aftercare or inappropriate design
- Ranges from land which is well maintained to areas which are not managed

OWNERSHIP: Usually council owned

ACCESS: Usually publicly accessible though areas such as verges may not be thought of as publicly accessible space

LANDSCAPE PATTERN: Predominantly grassland and wildflowers, occasional trees

MANAGEMENT: Grass is mown/maintained alongside main roads.

Grassland, Heathland, Moorland, Scrubland

Distinguishing Features

- Grasslands are areas where the dominant type of vegetation is grasses
- Heathlands and moorlands are areas associated with acidic ground where the dominant type of vegetation is low growing woody species
- Scrubland areas often occur on previously developed land, where pioneer species thrive
- Land of this type is quite varied, it often has a more “natural” wild appearance,
- Land of this type, particularly scrubland, is sometimes classed as “derelict” by local authorities. However it is a functioning piece of green infrastructure, even scrubland is land that is undergoing natural succession
- Many of the pitmounds of Telford & Wrekin are dominated by this type
- The appearance of this type will change as management is carried out, particularly if this involves burning

OWNERSHIP: Varied, both private and public ownership

ACCESS: Varied, mainly depending on ownership of the site

LANDSCAPE PATTERN: Rugged, usually has a more natural appearance

MANAGEMENT: Grassland will be mowed whereas heathland and moorland is likely to undergo controlled burning. Management techniques will differ; some sites may be heavily managed e.g. public grassland, whereas others may be left to natural succession e.g. brownfield land

MISC: A site could be designated for its function as a habitat for wildlife, e.g. as a Local Nature Reserve etc. Brownfield land is often under pressure from development

Green Roofs

Distinguishing Features

- Green roofs are roofs that are either partially or completely covered in vegetation, they can be found on buildings, shed and garages
- Their popularity is growing in the UK, as an effective method of adapting to climate change and controlling and reducing energy use within buildings
- Vegetation ranges from sedums, plants, perennials, grasses, to trees and shrubs depending on the strength of the roof
- Green roofs are unlikely to change overtime due to the limiting nature of their location, there may be seasonal variations in appearance

OWNERSHIP: Green roofs are owned by the owner of the building, therefore there is varied private and public ownership

ACCESS: Varied, depends on strength of roof and ownership

LANDSCAPE PATTERN: Can change the skyline of a town/city, will have a larger impact if several roofs are located close together

MANAGEMENT: Dependent on the type of vegetation used, can be intensive (more accessible 'park like' roofs involving grass, shrub and tree maintenance) or extensive (relatively self sustaining sedums and mosses)

MISC: Green roofs are often associated with photovoltaic panels, as locating these on green roofs boosts their productivity.

Institutional Grounds

Distinguishing Features

- Spaces found surrounding public or private commercial, industrial and retail buildings. For example offices, schools, shops, factories, hospitals and residential care homes
- Usually consists of grassed landscape, scattered shrubs and trees with potential ornamental plants and flowers
- Aims to provide attractive landscape “buffer” space around buildings
- Institutional grounds are subject to limited change over time, except seasonal variations

OWNERSHIP: Varied between public buildings and private companies/businesses

ACCESS: Most publicly owned land has public access during the daytime; grounds of some public buildings are always accessible. Privately owned institutional grounds tend to have lower levels of public access

LANDSCAPE PATTERN: Formal landscapes, often have a manicured and formal feel

MANAGEMENT: Relatively intensive management regime, could include regular cutting of grass and pruning of trees to achieve a sculptured look

MISC: This type of land may be at risk from development/expansion of existing buildings, particularly school fields

Not Green Infrastructure

Distinguishing Features

- Everything that is man-made and not green space, such as buildings, roofs, roads, footpaths, town squares, and car parks
- Varies in size from garden sheds to large expanses such as car parks
- It does not provide any of the green infrastructure functions
- Buildings with green roofs do not count as not green infrastructure

OWNERSHIP: Mixture of public and private

ACCESS: Dependent on ownership and type e.g. road, pubic building, private home

LANDSCAPE PATTERN: Common materials are concrete, brick, tarmac and plaster

MANAGEMENT: Needs little maintenance or management

Orchards

Distinguishing Features

- Parcels of land where fruit growing trees dominate the vegetation type
- Where these are publicly owned there is usually a strong community focus
- Includes orchards where fruit is grown and sold for commercial gain
- Limited change in appearance of site except where trees are felled

OWNERSHIP: Either private (usually for commercial gain) or community owned (for public benefit, often attached to a public park)

ACCESS: Dependent on ownership, limited to those with permission or keys to the site

LANDSCAPE PATTERN: Strong, lined avenues of trees, usually with clear borders to site

MANAGEMENT: Harvesting of fruit in autumn, grass under trees will be regularly mown

Outdoor Sports Facilities

Distinguishing Features

- All green land used for sports, it does not include Astroturf or other artificial pitches
- Examples include golf courses, football pitches and grass running tracks
- Sites usually contain large expanses of grass with border trees, shrubs and flowers
- Predominantly used for public recreation and physical activity
- Limited chance for change as need to maintain primary purpose of outdoor sports provision

OWNERSHIP: Either publicly owned or private clubs where members pay a subscription to join

ACCESS: Usually have to pay to access and at limited times according to classes etc.

LANDSCAPE PATTERN: Varied – depending on type of outdoor sports facility, usually grassland

MANAGEMENT: Intensive, grass will be kept short for sports. Border trees and shrubs may have more relaxed maintenance but will have to maintain “neat” appearance

Parks, Public Gardens & Recreation Grounds

Distinguishing Features

- The primary use of parks, public gardens & recreation grounds is informal recreation
- Sites can vary in structure and composition, from large grassed areas, to lakes, trees, and formal planting beds
- Some parks and gardens will contain infrastructure provision such as roads, play equipment, cafes and visitor centres
- This type is identifiable by its distinct boundaries, i.e. it is clear whether you are within the park or not
- The appearance of this type may change over time as the usage of the park changes, different areas of a park may have very different seasonal appearances too, i.e. a nature garden may have a "wilder" seasonal appearance than a formalised grass field which rarely changes

OWNERSHIP: Usually publically owned

ACCESS: Often controlled access, times may be limited and there may be a charge to enter

LANDSCAPE PATTERN: Distinctive and varied dependent on nature of park

MANAGEMENT: May vary within sites, and certainly varies between sites. Sites may be intensively managed to maintain a manicured look or left to a more "natural" feel

MISC: Parks often have friends of groups who contribute to the management, education, promotion and decision making guiding the future of the park

Private Domestic Gardens

Distinguishing Features

- Sites vary widely in size, from a small back yard to large fields
- Composition and management depends upon the enthusiasm, age, and knowledge of the owner, therefore quality of composition and management varies
- Private domestic gardens could contain a variety of; trees, shrubs, grass, flower beds, fruit and vegetables
- Many gardens contain areas of decking/paving/sheds/patio – these are impervious surfaces and are not classed as part of the green infrastructure.
- Private domestic gardens may change in composition as ownership of the dwelling changes. Also as the age of the owner, and their enthusiasm or knowledge varies, management of the site may increase, reduce or stop

OWNERSHIP: Usually attached to a private dwelling and thus in private ownership

ACCESS: Limited to those who own or are invited by the owner

LANDSCAPE PATTERN: Collectively gardens in residential areas will form a strong landscape pattern

MANAGEMENT: Dependent on the enthusiasm/age/knowledge of owner, usually controlled planting and maintenance

MISC: Private domestic gardens often make up a significant part of the green fabric of urban areas

Street Trees

Distinguishing Features

- Street trees are trees planted in the public realm, usually alongside roads and in town squares
- Vary from small street trees in residential areas, to large grand trees in town centre squares, though trees of any size can be found in any area
- Includes all species of tree
- Appearance may change due to felling/pruning and occasionally due to vandalism

OWNERSHIP: Usually publicly owned. Can be privately owned if on private land

ACCESS: Dependent on ownership, normally publicly accessible

LANDSCAPE PATTERN: Provide character through varied species choice and can enhance Quality of Place

MANAGEMENT: Publicly owned trees will be managed by the local authority and will be regularly pruned

MISC: Usually located on the pavement edge in tree pits, requires reasonably wide pavements. Urban planters and other green “street furniture” is also classified as this type

Water Bodies

Distinguishing Features

- Small or large expanses of open non moving water
- Includes lakes, ponds, reservoirs and harbours
- Water bodies can be actively used e.g. for water sports or for aesthetical quality in a development
- Unlikely to change over time, with no seasonal variation. Potential for expansion/extension of existing water bodies

OWNERSHIP: Mixture of private and public

ACCESS: Dependent on ownership, often accessible with prior notification of landowner

LANDSCAPE PATTERN: Water bodies are usually a dominant feature of the landscape or site

MANAGEMENT: Can be managed to promote wildlife in an area. Management may include draining or dredging. Water quality may be monitored and could influence future management

Water Courses

Distinguishing Features

- Small or large areas of moving water, includes natural and man-made channels
- Includes rivers, streams, and canals
- Includes bankside areas, unless these are definable as a separate type within the typology
- Natural water courses are likely to change over time as the banks erode and the course of the river changes. Man made changes such a dam creation and flow alterations will lead to aesthetic changes

OWNERSHIP: Mixture of public and private ownership

ACCESS: Dependent on ownership, often accessible with prior notification of landowner

LANDSCAPE PATTERN: Water courses usually divide land and are sometimes used as boundaries for sites

MANAGEMENT: Management may include draining or dredging. Water quality may be monitored and could influence future management. Management may include bank erosion protection

MISC: Close links between this type and areas designated for controlled flooding

Wetlands

Distinguishing Features

- Wetlands are areas of land where the soil is saturated with water, some or all of the time
- Land of this type has expanses of water, wet habitats, including fen, marsh, bog and wet flush vegetation
- Vegetation in these areas has to be adapted to deal with high water levels
- May have a “wild” appearance
- Unlikely to change in appearance except potential for drying out in instances of extreme heat/drought

OWNERSHIP: Usually publicly owned

ACCESS: Often publicly accessible on boardwalks or viewing platforms

ANDSCAPE PATTERN: Loose, often sporadic patches of water/marsh

MANAGEMENT: Usually a “hands off” approach is taken with wetlands where the land is managed for nature conservation

MISC: Often designated as a protected habitat for wildlife

Woodlands

Distinguishing Features

- A woodland is a parcel of land where there are more than just scattered trees – trees are the dominant vegetation type
- There are many different types of woodland, coniferous, non coniferous, ancient, semi natural etc. All are included in this type
- Woodlands vary in size, density, age, ownership, and species composition
- Sites may be commercially managed for timber production or maintained as woodland for public recreation or as a habitat
- Appearance will change in commercial woodlands as trees are felled and re-planted. In other woodlands the changes will mainly be seasonal and occasional coppicing and thinning

OWNERSHIP: Commercial woodlands are predominantly privately owned, public woodlands usually exist for public benefit or as a wildlife habitat

ACCESS: Dependent on ownership, access is usually allowed in public woodlands

LANDSCAPE PATTERN: Strong, trees dominate the area and form a definite structure

MANAGEMENT: If managed commercially, will be intensive rotation of yields, publicly owned woodlands may be managed more for biodiversity or public recreation

MISC: This type often occurs on regenerated pitmounds

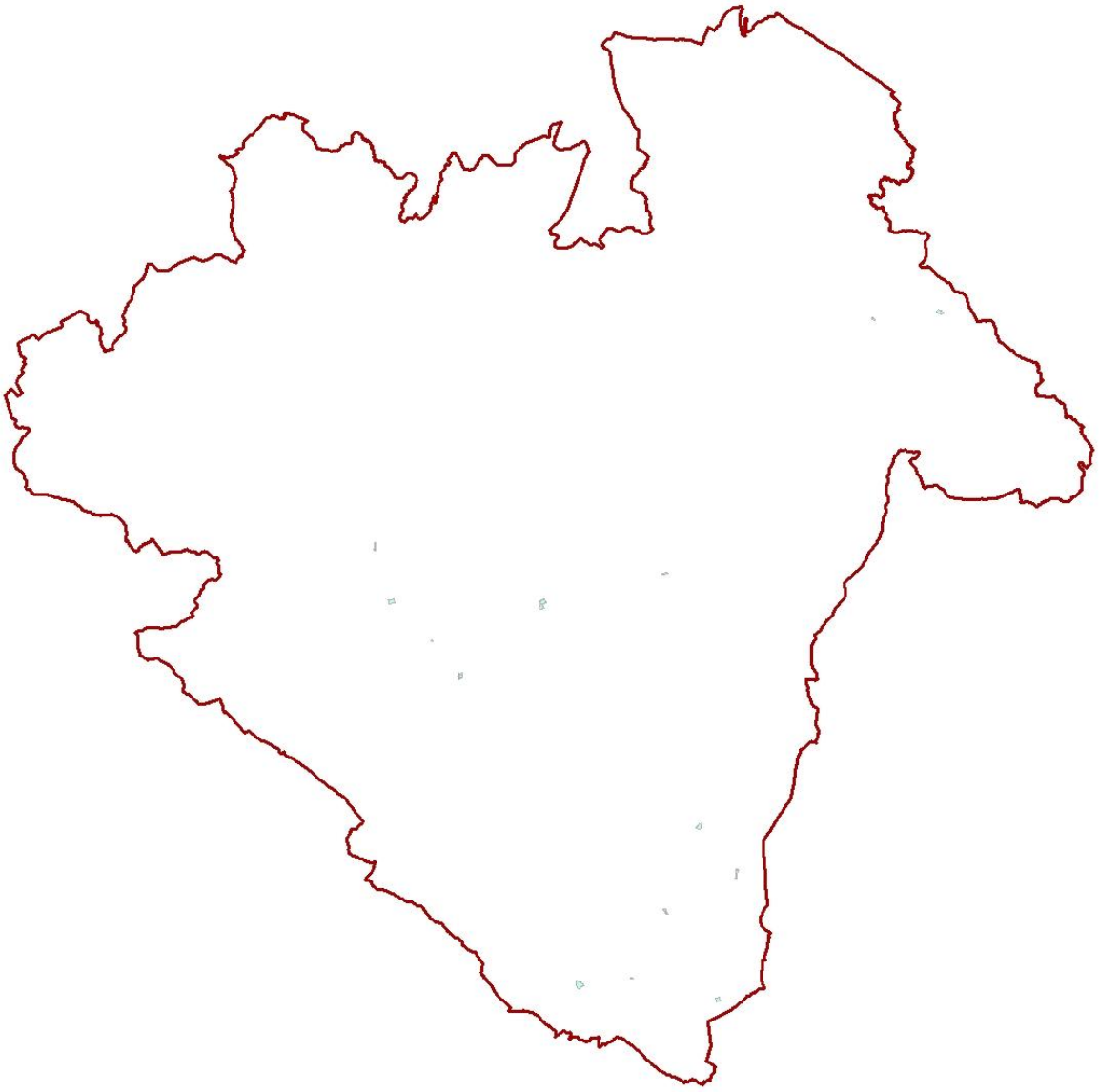
Appendix 3: Typology Maps

Agricultural Land

Legend

Agricultural Land

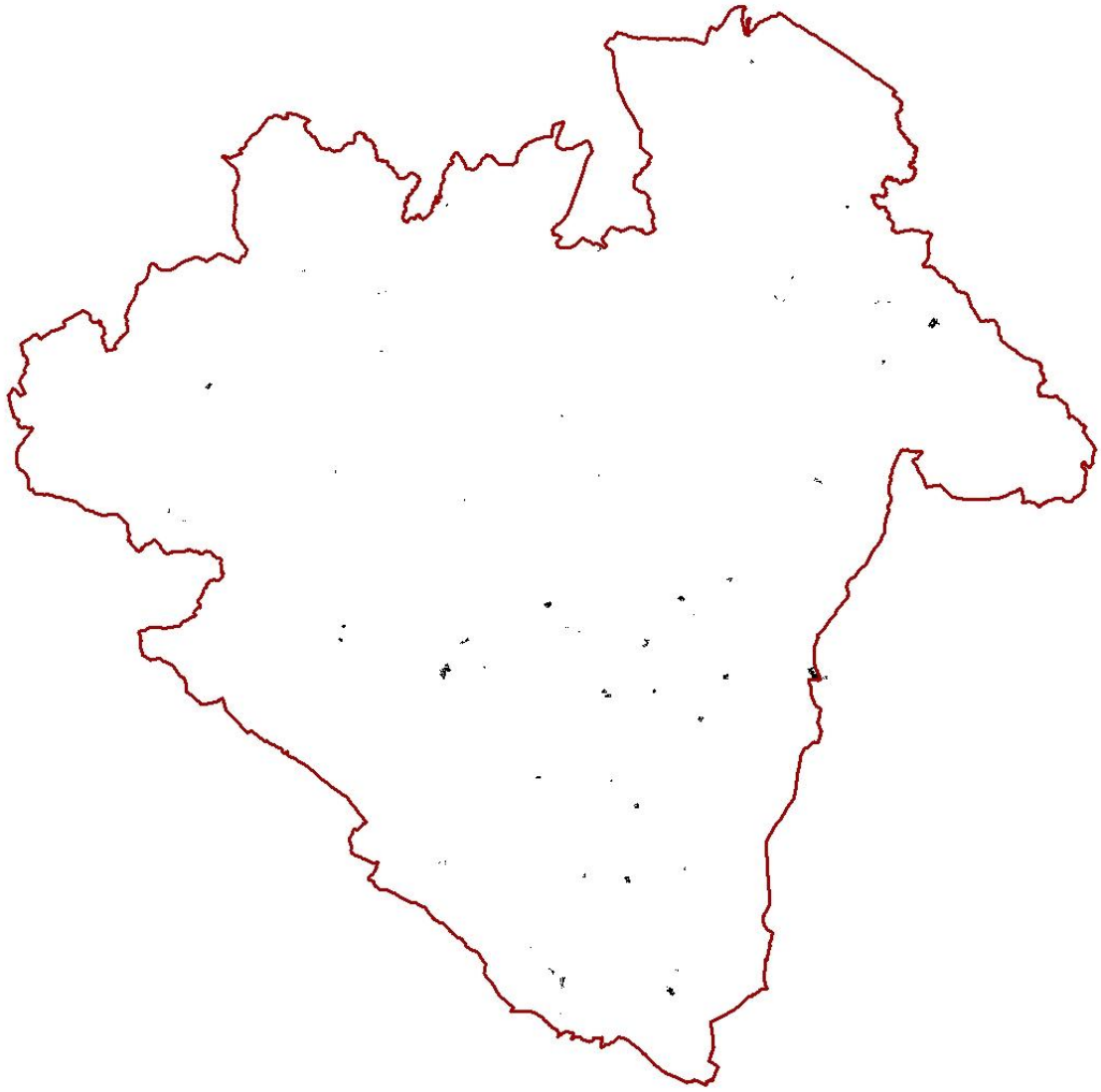
Allotments & Community Gardens



Legend

Allotments & Community Gardens

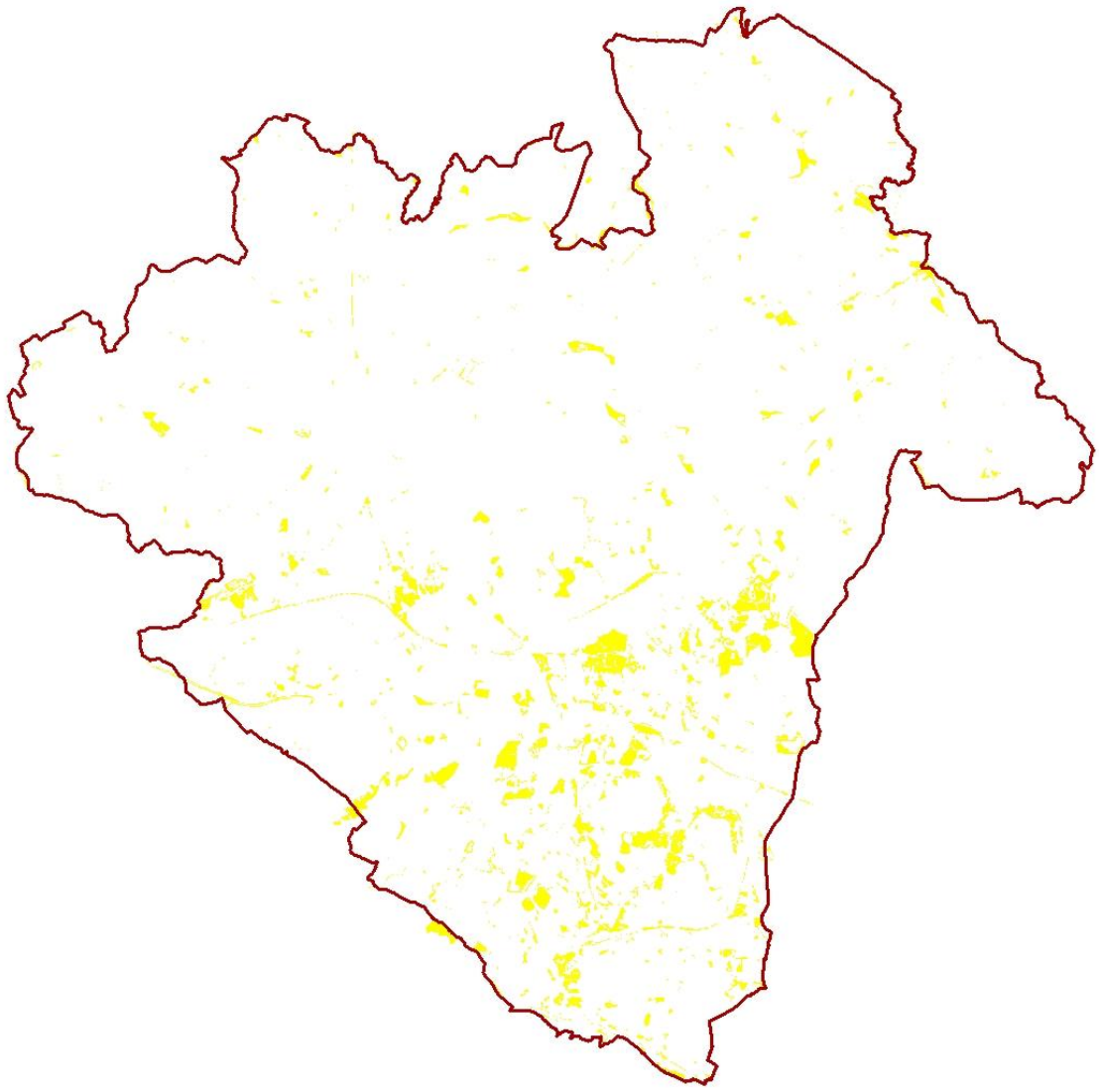
Cemeteries, Churchyards & Burial Grounds



Legend

Cemeteries, Churchyards & Burial Grounds

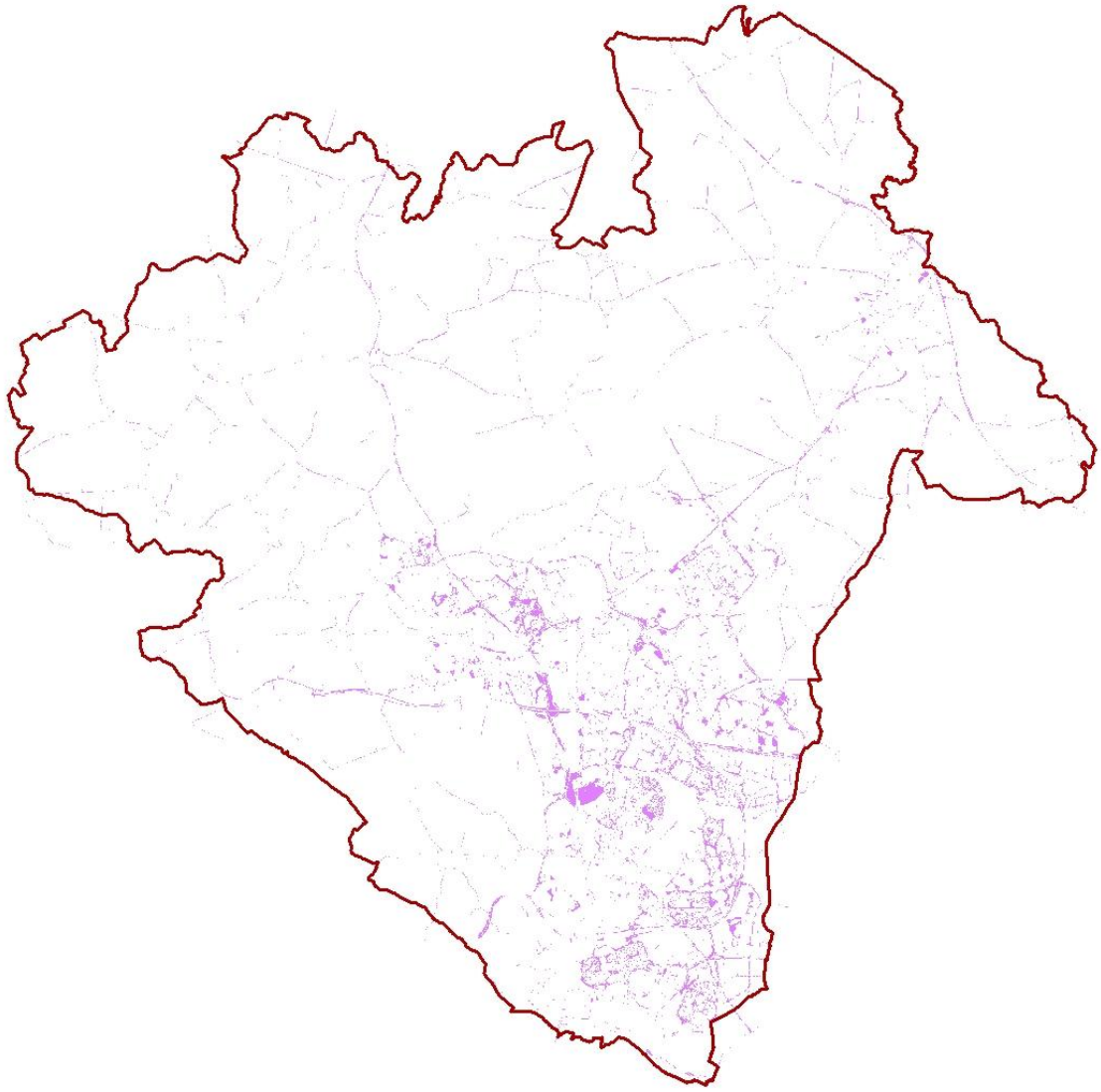
Grassland, Heathland, Moorland, Scrubland



Legend

Grassland, Heathland, Moorland & Scrubland

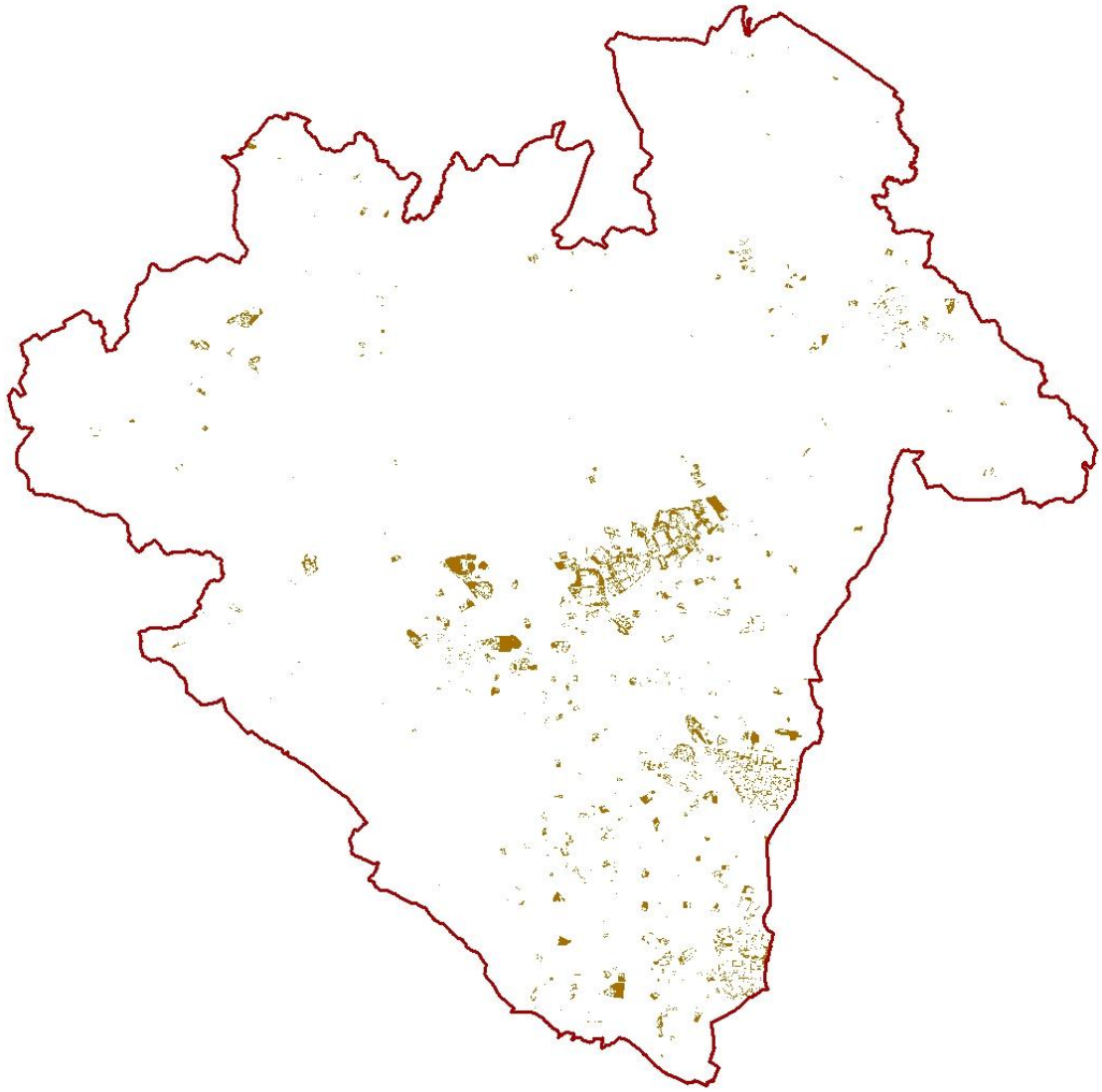
Incidental Green Space



Legend

Incidental Green Space

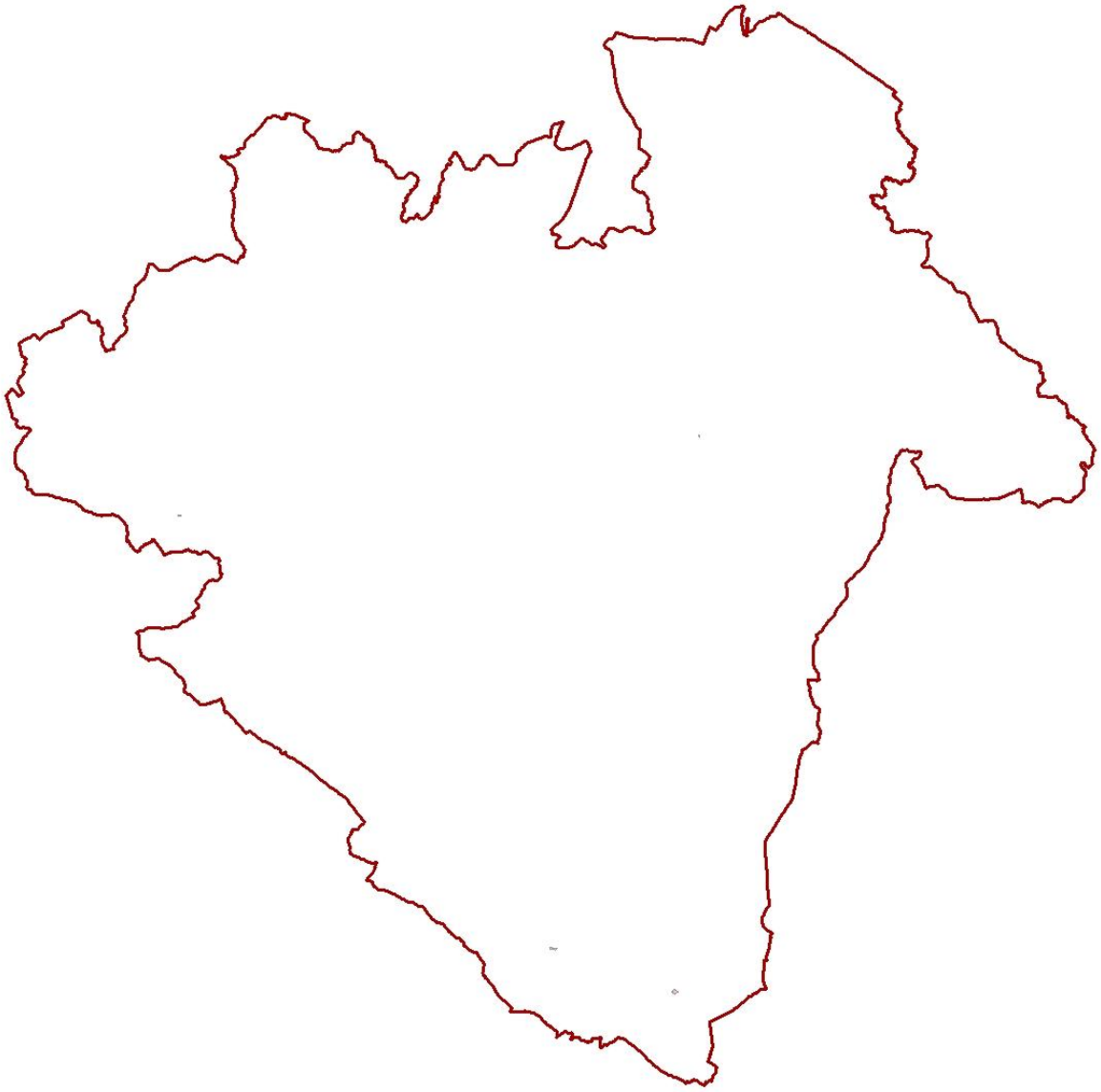
Institutional Grounds



Legend

Institutional Grounds

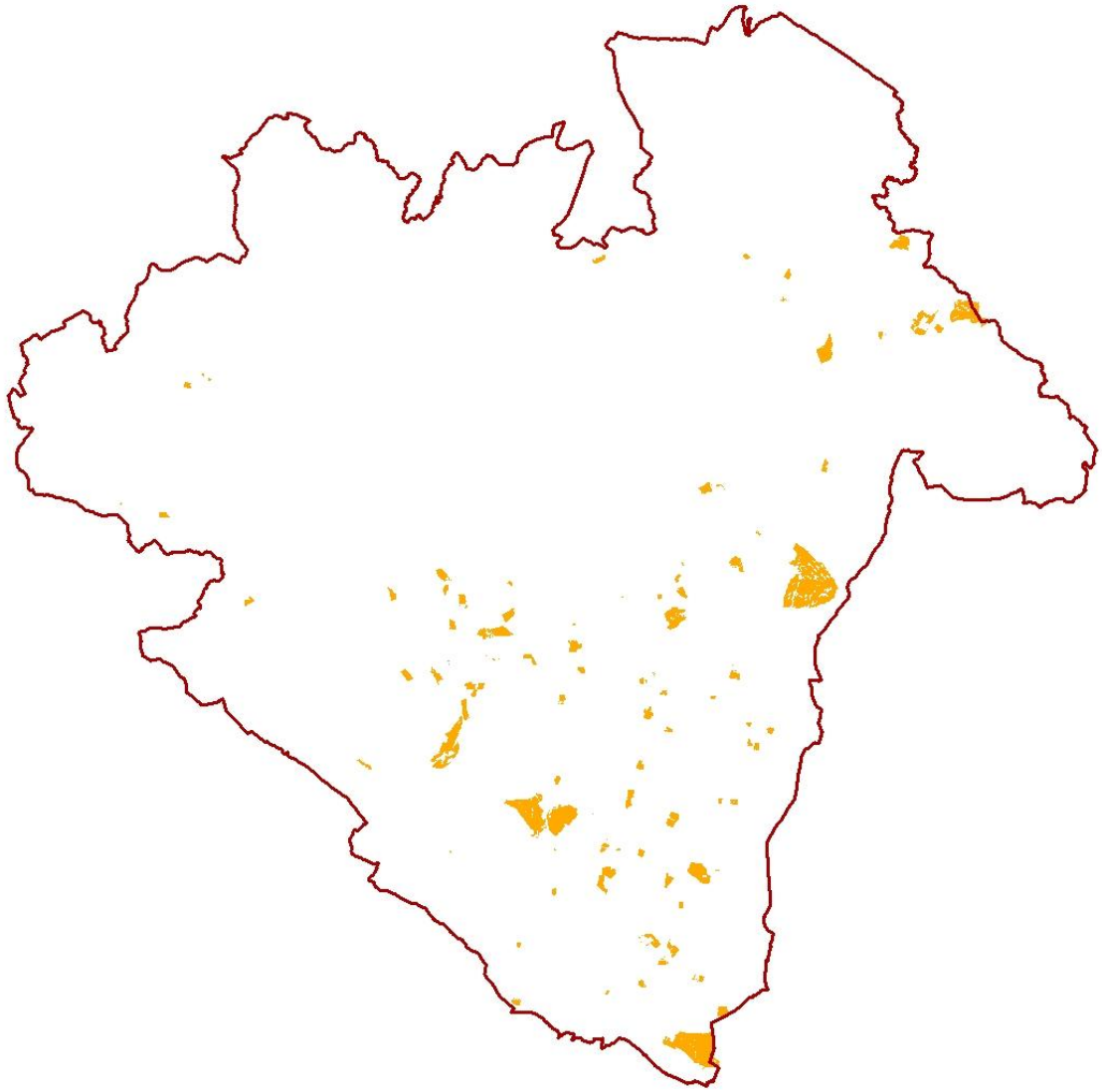
Orchards



Legend

Orchards

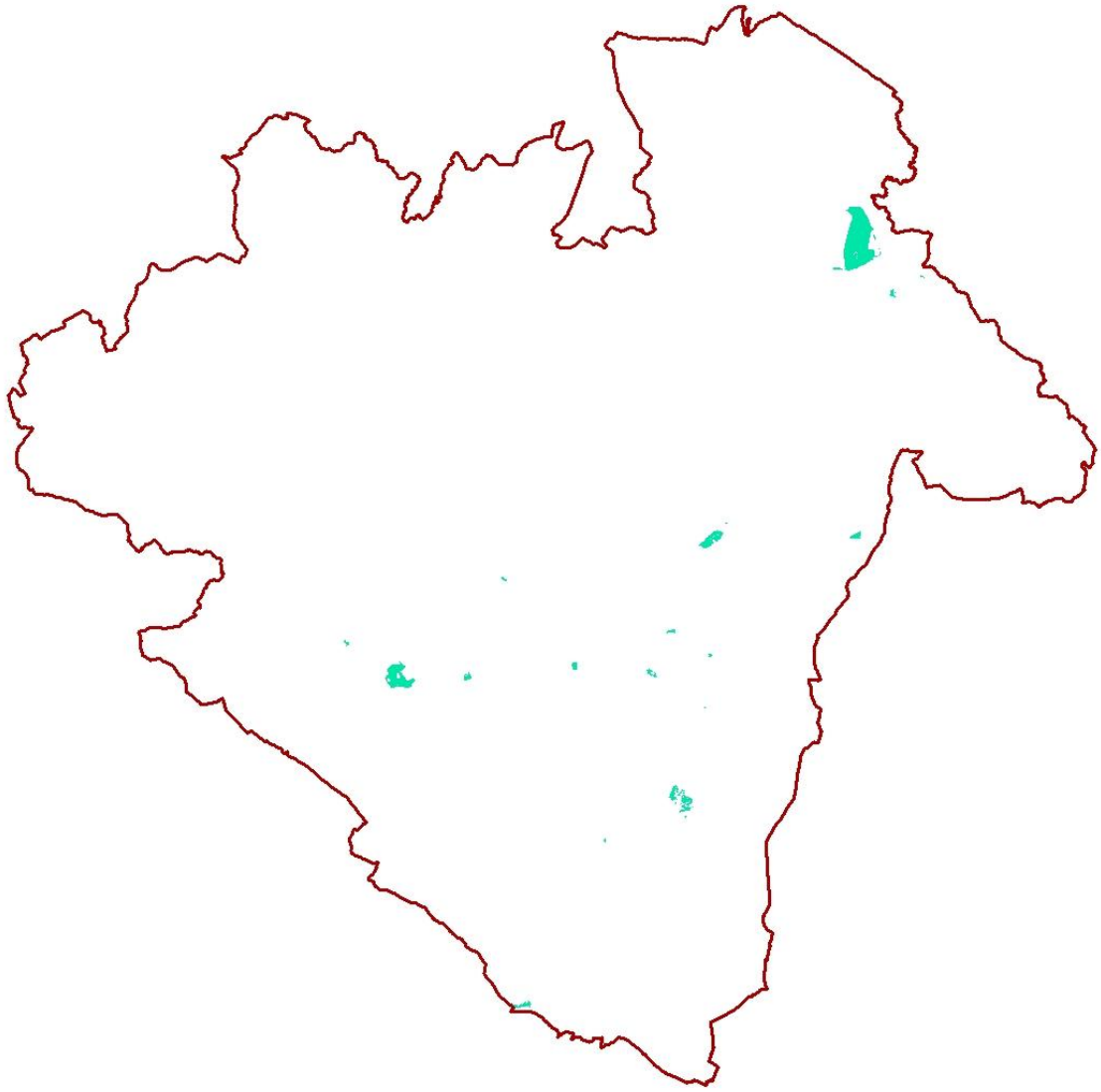
Outdoor Sports Facilities



Legend

Outdoor Sports Facilities

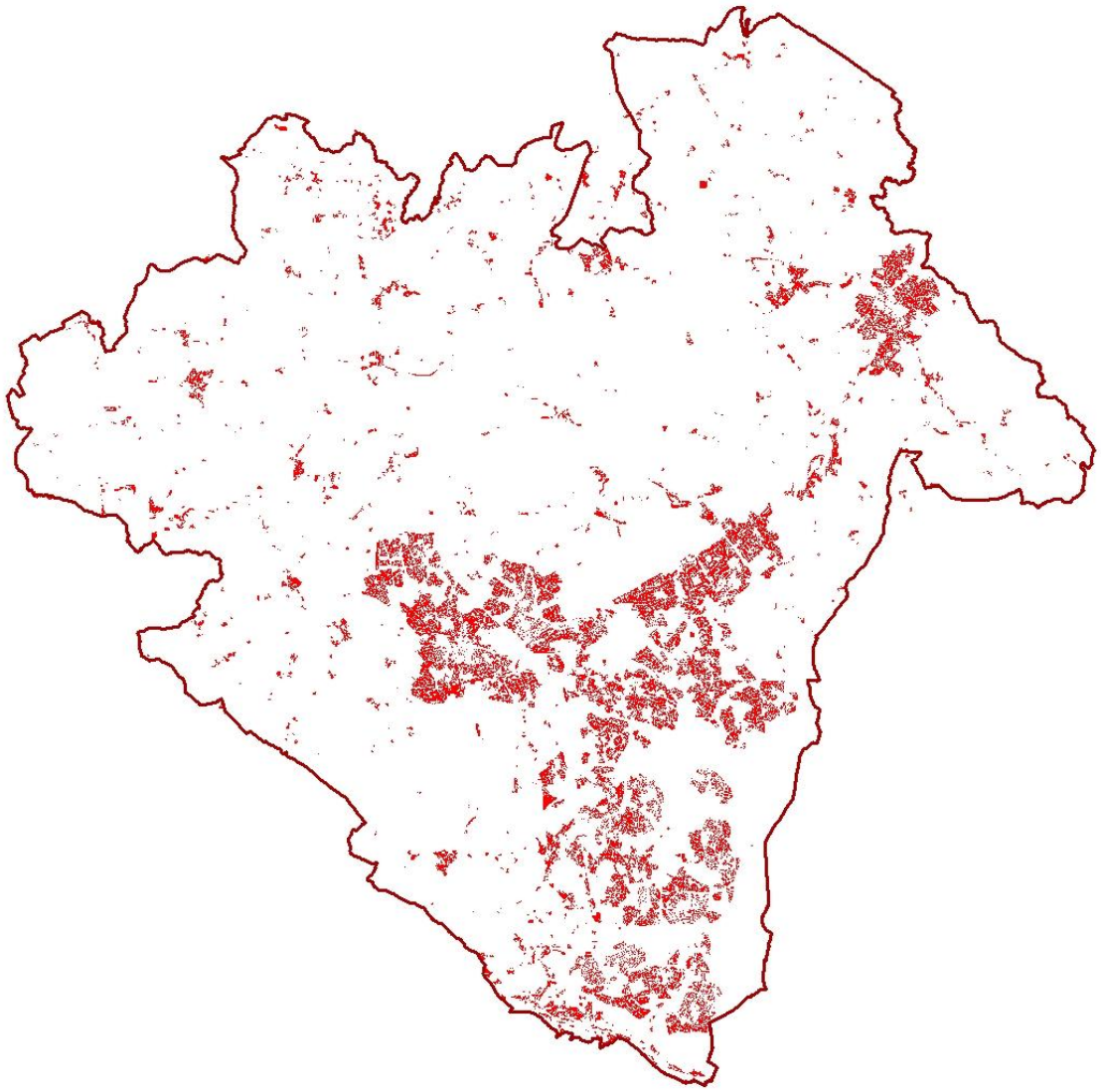
Parks, Public Gardens and Recreation Grounds



Legend

Parks, Public Gardens & Recreation Grounds

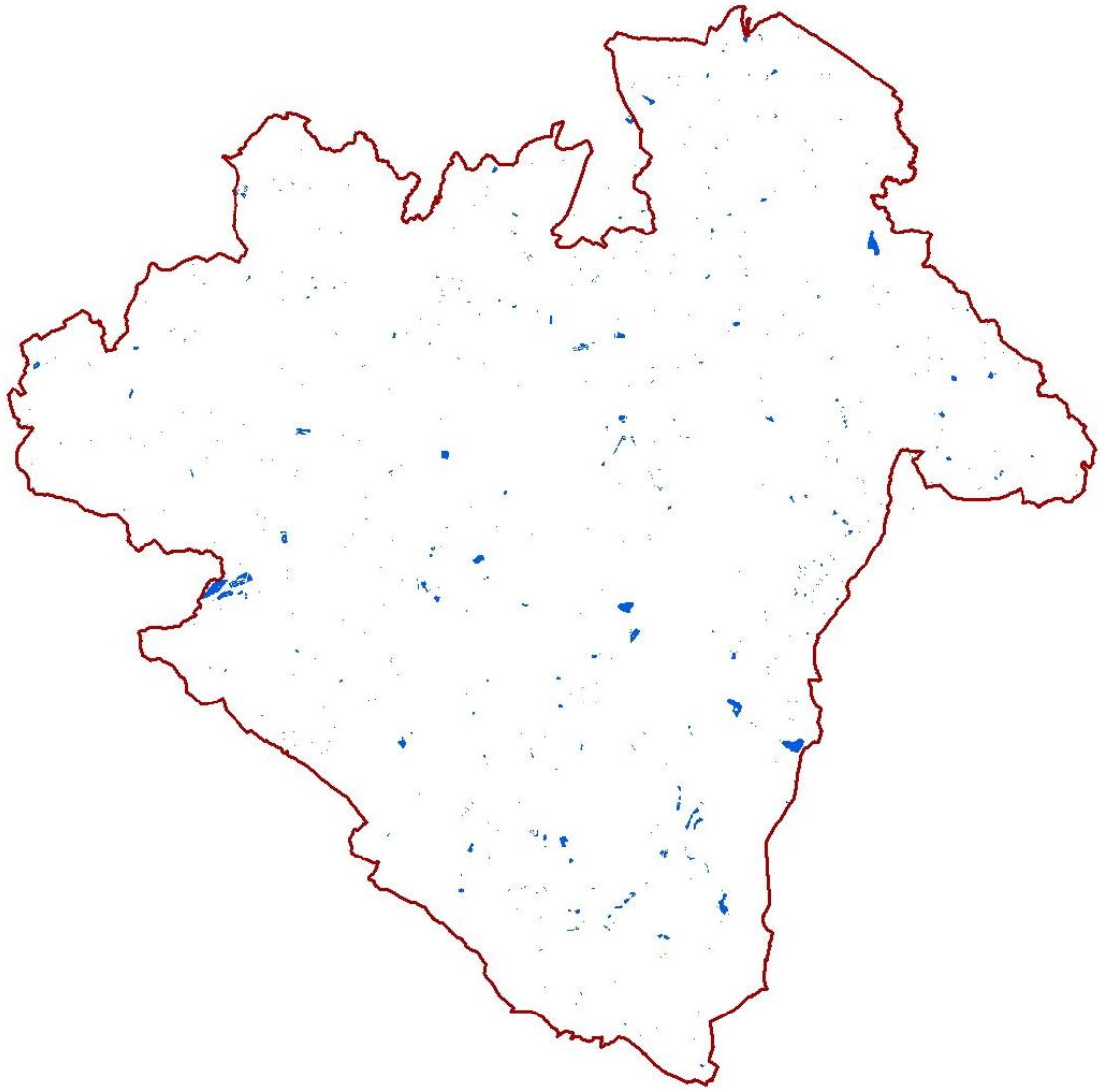
Private Domestic Gardens



Legend

Private Domestic Gardens

Water Bodies



Legend

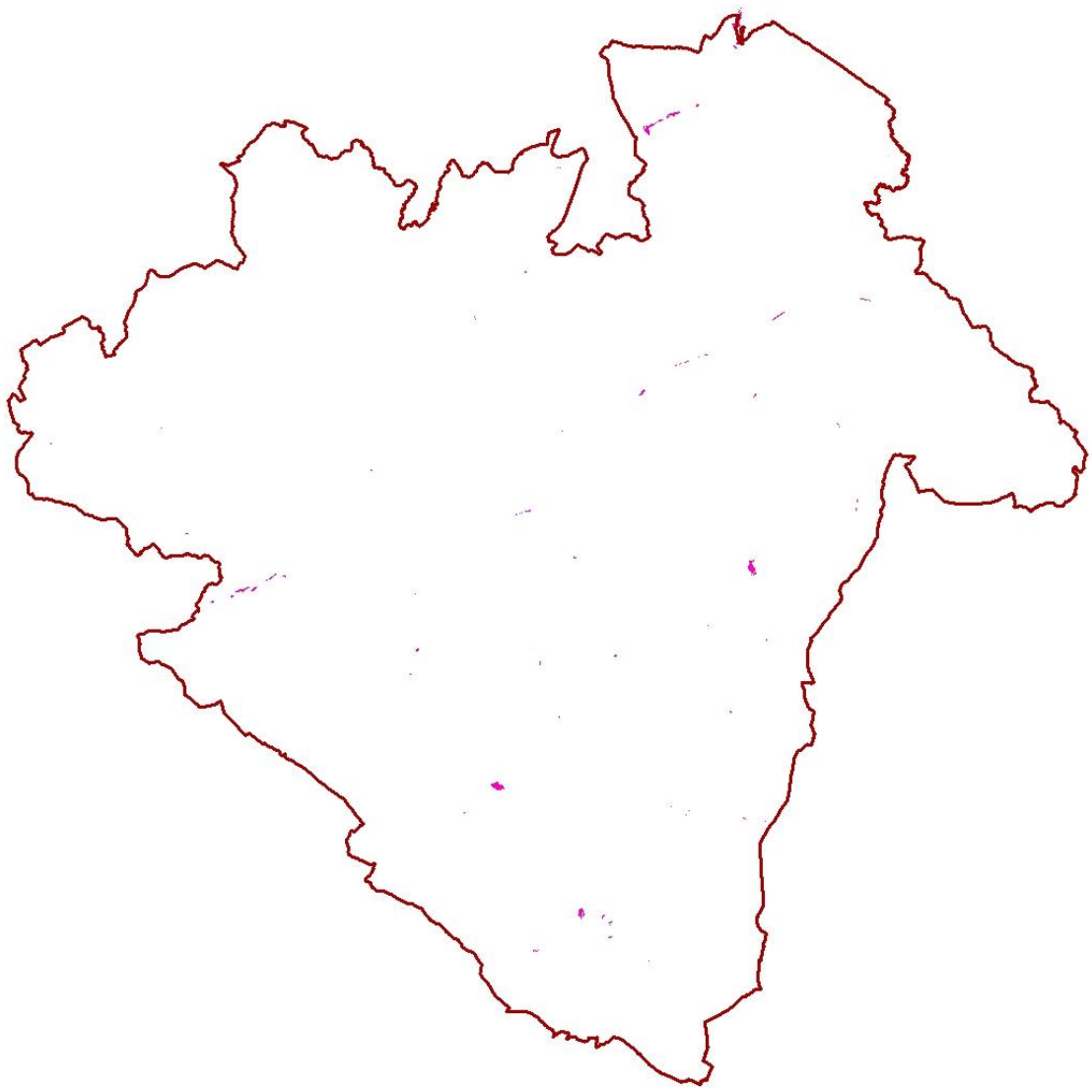
Water Bodies

Water Courses

Legend

Water Courses

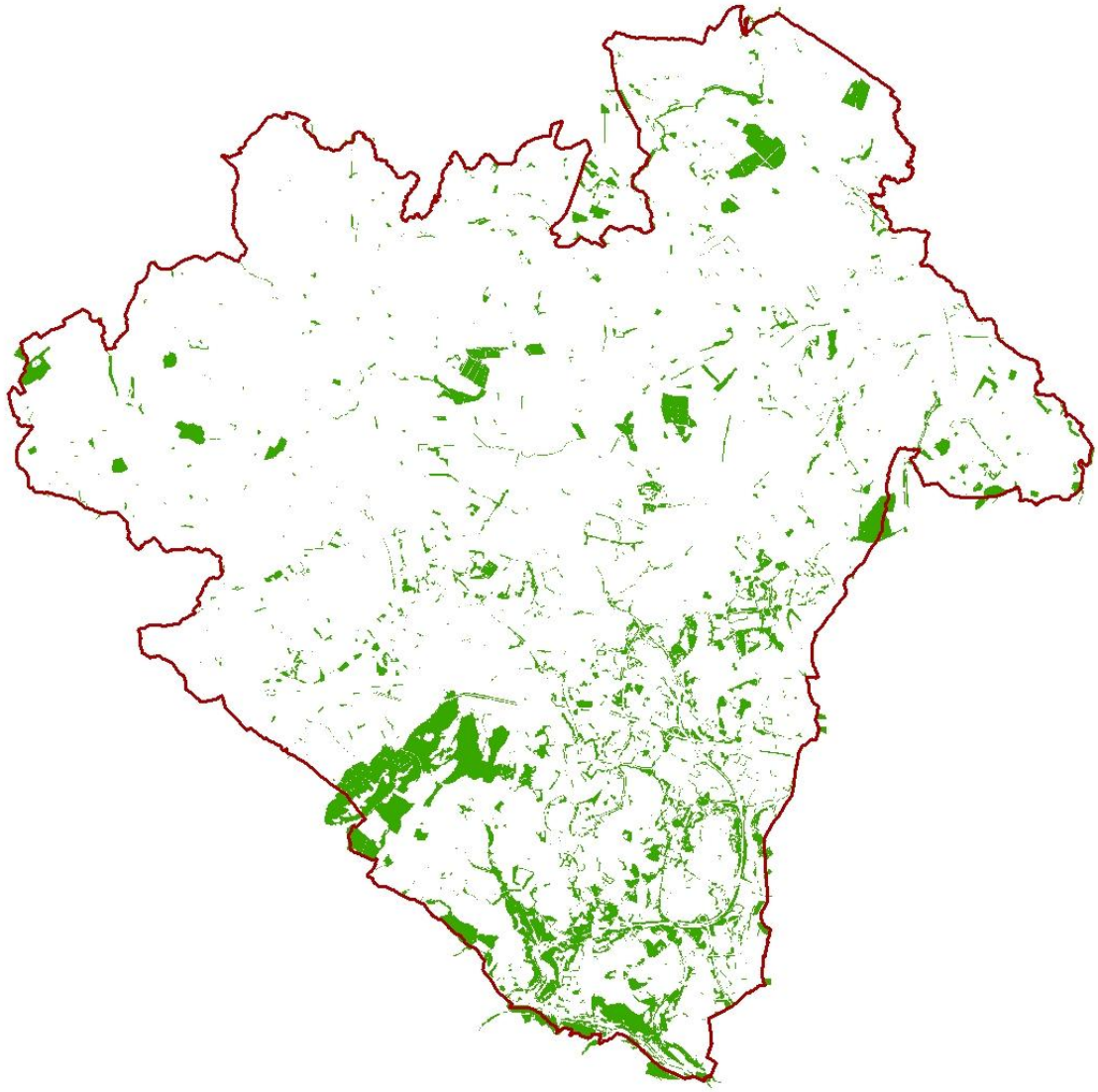
Wetland



Legend

Wetland

Woodland



Appendix 4: Function Thresholds

The following tables take each function in turn and show under what circumstances each type of green infrastructure would be providing the function in question.

Does each type below perform: **AESTHETIC**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	A	
Allotments & Community Gardens	A	
Cemeteries, Churchyards & Burial Grounds	A	
Incidental Green Space	A	
Grassland, Heathland, Moorland, Scrubland	A	
Green Roofs	A	
Institutional Grounds	A	
Orchards	A	
Outdoor Sports Facilities	A	
Parks, Public Gardens & Recreation Grounds	A	
Private Domestic Gardens	A	
Street Trees	A	
Water Bodies	A	
Water Courses	A	
Wetlands	A	
Woodlands	A	

Does each type below perform: **ACCESSIBLE WATER STORAGE**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	N	
Incidental Green Space	N	
Grassland, Heathland, Moorland, Scrubland	N	
Green Roofs	N	
Institutional Grounds	N	
Orchards	N	
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	N	
Private Domestic Gardens	N	
Street Trees	N	
Water Bodies	A	
Water Courses	A	
Wetlands	S	Where open water on aerial photos
Woodlands	N	

Does each type below perform: **BIOFUELS PRODUCTION**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	where Energy Crops (Natural England data)
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	N	
Incidental Green Space	N	
Grassland, Heathland, Moorland, Scrubland	N	
Green Roofs	N	
Institutional Grounds	N	
Orchards	N	
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	N	
Private Domestic Gardens	N	
Street Trees	N	
Water Bodies	N	
Water Courses	N	
Wetlands	N	
Woodlands	A	

Does each type below perform: **BURIAL SPACE**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	A	
Incidental Green Space	N	
Grassland, Heathland, Moorland, Scrubland	N	
Green Roofs	N	
Institutional Grounds	N	
Orchards	N	
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	N	
Private Domestic Gardens	N	
Street Trees	N	
Water Bodies	N	
Water Courses	N	
Wetlands	N	
Woodlands	N	

Does each type below perform: **CARBON STORAGE**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	S	If significant tree cover
Incidental Green Space	S	If significant tree cover
Grassland, Heathland, Moorland, Scrubland	S	Peat soil/ significant tree cover
Green Roofs	S	If significant tree cover
Institutional Grounds	S	If significant tree cover
Orchards	A	
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	S	If significant tree cover
Private Domestic Gardens	S	If significant tree cover
Street Trees	A	
Water Bodies	N	
Water Courses	N	
Wetlands	N	
Woodlands	A	

Does each type below perform: **CORRIDOR FOR WILDLIFE**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Allotments & Community Gardens	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Cemeteries, Churchyards & Burial Grounds	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Incidental Green Space	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Grassland, Heathland, Moorland, Scrubland	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Green Roofs	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Institutional Grounds	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Orchards	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Outdoor Sports Facilities	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Parks, Public Gardens & Recreation Grounds	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Private Domestic Gardens	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Street Trees	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Water Bodies	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Water Courses	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Wetlands	S	Buffer of 10m around and including habitats (if intersects by > 10%)
Woodlands	S	Buffer of 10m around and including habitats (if intersects by > 10%)

Does each type below perform: **CULTURAL ASSET**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	A	
Incidental Green Space	S	If Village Green
Grassland, Heathland, Moorland, Scrubland	N	
Green Roofs	S	As part of A3/A4 use class
Institutional Grounds	S	When part of museum grounds/church
Orchards	A	
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	A	
Private Domestic Gardens	N	
Street Trees	N	
Water Bodies	N	
Water Courses	N	
Wetlands	N	
Woodlands	N	

Does each type below perform: **EVAPORATIVE COOLING**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	A	
Allotments & Community Gardens	A	
Cemeteries, Churchyards & Burial Grounds	A	
Incidental Green Space	A	
Grassland, Heathland, Moorland, Scrubland	A	
Green Roofs	A	
Institutional Grounds	A	
Orchards	A	
Outdoor Sports Facilities	A	
Parks, Public Gardens & Recreation Grounds	A	
Private Domestic Gardens	A	
Street Trees	A	
Water Bodies	A	
Water Courses	A	
Wetlands	A	
Woodlands	A	

Does each type below perform: **FLOW REDUCTION THROUGH SURFACE ROUGHNESS**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	N	
Incidental Green Space	N	
Grassland, Heathland, Moorland, Scrubland	S	If slope < 5^0
Green Roofs	N	
Institutional Grounds	N	
Orchards	S	If rough ground / dense ground cover and slope < 5^0
Outdoor Sports Facilities	S	If rough ground / dense ground cover and slope < 5^0
Parks, Public Gardens & Recreation Grounds	N	
Private Domestic Gardens	N	
Street Trees	N	
Water Bodies	N	
Water Courses	N	
Wetlands	S	If slope < 5^0
Woodlands	S	If slope < 5^0

Does each type below perform: **FOOD PRODUCTION**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	A	
Allotments & Community Gardens	A	
Cemeteries, Churchyards & Burial Grounds	N	
Incidental Green Space	N	
Grassland, Heathland, Moorland, Scrubland	N	
Green Roofs	S	If food producing plants
Institutional Grounds	N	
Orchards	A	
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	N	
Private Domestic Gardens	N	
Street Trees	N	
Water Bodies	S	If fishing licence
Water Courses	S	If fishing licence
Wetlands	N	
Woodlands	N	

Does each type below perform: **GREEN TRAVEL ROUTE**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	Within 2m of B roads, PROW, Sustrans
Allotments & Community Gardens	S	Within 2m of B roads, PROW, Sustrans
Cemeteries, Churchyards & Burial Grounds	S	Within 2m of B roads, PROW, Sustrans
Incidental Green Space	N	
Grassland, Heathland, Moorland, Scrubland	S	Within 2m of B roads, PROW, Sustrans
Green Roofs	N	
Institutional Grounds	N	
Orchards	S	Within 2m of B roads, PROW, Sustrans
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	S	Within 2m of B roads, PROW, Sustrans
Private Domestic Gardens	N	
Street Trees	N	
Water Bodies	S	Within 2m of B roads, PROW, Sustrans
Water Courses	S	Within 2m of B roads, PROW, Sustrans
Wetlands	S	Within 2m of B roads, PROW, Sustrans
Woodlands	S	Within 2m of B roads, PROW, Sustrans

Does each type below perform: **GROUND STABILISATION**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	S	Areas prone to erosion - steep slopes > 16^0, flood plains
Incidental Green Space	S	Areas prone to erosion - steep slopes > 16^0, flood plains
Grassland, Heathland, Moorland, Scrubland	S	Areas prone to erosion - steep slopes > 16^0, flood plains
Green Roofs	N	
Institutional Grounds	S	Areas prone to erosion - steep slopes >16^0, flood plains
Orchards	S	Areas prone to erosion - steep slopes >16^0, flood plains
Outdoor Sports Facilities	S	Areas prone to erosion - steep slopes >16^0, flood plains
Parks, Public Gardens & Recreation Grounds	S	Areas prone to erosion - steep slopes >16^0, flood plains
Private Domestic Gardens	S	Areas prone to erosion - steep slopes >16^0, flood plains
Street Trees	S	Areas prone to erosion - steep slopes >16^0, flood plains
Water Bodies	N	
Water Courses	N	
Wetlands	S	Areas prone to erosion - steep slopes >16^0, flood plains
Woodlands	S	Areas prone to erosion - steep slopes >16^0, flood plains

Does each type below perform: **HABITAT FOR WILDLIFE**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	Environmental Stewardship Schemes
Allotments & Community Gardens	S	Designated sites, sensitive management, eco features
Cemeteries, Churchyards & Burial Grounds	S	Designated sites, sensitive management, eco features
Incidental Green Space	S	Designated sites, sensitive management, eco features. Where conservation verge - identified by mgt (grass grade (6-9) less frequent cut
Grassland, Heathland, Moorland, Scrubland	A	
Green Roofs	A	
Institutional Grounds	S	Designated sites, sensitive management, eco features
Orchards	A	
Outdoor Sports Facilities	S	Designated sites, sensitive management, eco features
Parks, Public Gardens & Recreation Grounds	S	Designated sites, sensitive management, eco features
Private Domestic Gardens	S	Designated sites, sensitive management, eco features
Street Trees	A	
Water Bodies	A	
Water Courses	A	
Wetlands	A	
Woodlands	A	

Does each type below perform: **HERITAGE**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchard, ancient trees/woodlands
Allotments & Community Gardens	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchards, ancient trees/woodlands
Cemeteries, Churchyards & Burial Grounds	A	
Incidental Green Space	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchards, ancient trees/woodlands
Grassland, Heathland, Moorland, Scrubland	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchards, ancient trees/woodlands
Green Roofs	N	
Institutional Grounds	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchards, ancient trees/woodlands
Orchards	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchards, ancient trees/woodlands
Outdoor Sports Facilities	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchards, ancient trees/woodlands
Parks, Public Gardens & Recreation Grounds	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchards, ancient trees/woodlands
Private Domestic Gardens	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchards, ancient trees/woodlands
Street Trees	S	If within conservation area/TPO
Water Bodies	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchards, ancient trees/woodlands
Water Courses	S	Designated WHS, conservation area or Canal
Wetlands	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchards, ancient trees/woodlands
Woodlands	S	Designated WHS, conservation area, scheduled monuments, historic park/garden, orchards, ancient trees/woodlands

Does each type below perform: **INACCESSIBLE WATER STORAGE**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	High porosity soil or SUDS present and not colliery spoil
Allotments & Community Gardens	S	High porosity soil or SUDS present and not colliery spoil
Cemeteries, Churchyards & Burial Grounds	S	High porosity soil or SUDS present and not colliery spoil
Incidental Green Space	S	High porosity soil or SUDS present and not colliery spoil
Grassland, Heathland, Moorland, Scrubland	S	High porosity soil or SUDS present and not colliery spoil
Green Roofs	S	If trees present
Institutional Grounds	S	High porosity soil or SUDS present and not colliery spoil
Orchards	A	
Outdoor Sports Facilities	S	High porosity soil or SUDS present and not colliery spoil
Parks, Public Gardens & Recreation Grounds	S	High porosity soil or SUDS present and not colliery spoil
Private Domestic Gardens	S	High porosity soil or SUDS present and not colliery spoil
Street Trees	S	High porosity soil or SUDS present and not colliery spoil
Water Bodies	N	
Water Courses	N	
Wetlands	A	
Woodlands	A	

Does each type below perform: **LEARNING**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	Farm open days, learning farms (e.g. Hoo/Harper)
Allotments & Community Gardens	S	If ranger/ educations skills group
Cemeteries, Churchyards & Burial Grounds	N	
Incidental Green Space	N	
Grassland, Heathland, Moorland, Scrubland	S	If visitor centre
Green Roofs	S	If designed accordingly
Institutional Grounds	S	Grounds of educational establishments
Orchards	N	
Outdoor Sports Facilities	S	Grounds of educational establishments
Parks, Public Gardens & Recreation Grounds	S	If visitor centre
Private Domestic Gardens	N	
Street Trees	N	
Water Bodies	N	
Water Courses	N	
Wetlands	S	If visitor centre / grounds of educational establishment
Woodlands	S	If visitor centre / grounds of educational establishment / where used for forest schools

Does each type below perform: **NOISE ABSORPTION**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	S	If significant tree cover & close to road/rail
Incidental Green Space	S	If significant tree cover & close to road/rail
Grassland, Heathland, Moorland, Scrubland	S	If significant tree cover & close to road/rail
Green Roofs	S	If significant tree cover & close to road/rail
Institutional Grounds	S	If significant tree cover & close to road/rail
Orchards	S	If within 250m of road/rail
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	S	If significant tree cover & close to road/rail
Private Domestic Gardens	S	If significant tree cover & close to road/rail
Street Trees	S	If within 250m of road/rail
Water Bodies	N	
Water Courses	N	
Wetlands	N	
Woodlands	S	If within 250m of road/rail

Does each type below perform: **POLLUTANT REMOVAL FROM SOIL/WATER**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	If SUDS / High levels of vegetation
Allotments & Community Gardens	S	If SUDS / High levels of vegetation
Cemeteries, Churchyards & Burial Grounds	S	If SUDS / High levels of vegetation
Incidental Green Space	S	If SUDS / High levels of vegetation
Grassland, Heathland, Moorland, Scrubland	S	If SUDS / High levels of vegetation
Green Roofs	A	
Institutional Grounds	S	If SUDS / High levels of vegetation
Orchards	A	
Outdoor Sports Facilities	S	If SUDS / High levels of vegetation
Parks, Public Gardens & Recreation Grounds	S	If SUDS / High levels of vegetation
Private Domestic Gardens	S	If SUDS / High levels of vegetation
Street Trees	A	
Water Bodies	S	If SUDS / High levels of vegetation
Water Courses	S	If SUDS / High levels of vegetation
Wetlands	A	
Woodlands	A	

Does each type below perform: **PRIVATE RECREATION**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	N	
Incidental Green Space	N	
Grassland, Heathland, Moorland, Scrubland	N	
Green Roofs	S	If no public access
Institutional Grounds	N	
Orchards	S	If no public access
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	N	
Private Domestic Gardens	A	
Street Trees	N	
Water Bodies	S	If no public access
Water Courses	N	
Wetlands	N	
Woodlands	S	If no public access

Does each type below perform: **PUBLIC RECREATION**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	S	If publicly accessible
Cemeteries, Churchyards & Burial Grounds	A	
Incidental Green Space	S	If suitable size, and publicly accessible
Grassland, Heathland, Moorland, Scrubland	S	If publicly accessible
Green Roofs	S	If publicly accessible
Institutional Grounds	S	If publicly accessible
Orchards	S	If publicly accessible
Outdoor Sports Facilities	A	
Parks, Public Gardens & Recreation Grounds	A	
Private Domestic Gardens	N	
Street Trees	N	
Water Bodies	S	If publicly accessible
Water Courses	S	If publicly accessible
Wetlands	S	If publicly accessible
Woodlands	S	If publicly accessible

Does each type below perform: **PUBLIC RECREATION WITH RESTRICTIONS**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	If PROW/ farm open days
Allotments & Community Gardens	S	Unless publicly accessible
Cemeteries, Churchyards & Burial Grounds	N	
Incidental Green Space	N	
Grassland, Heathland, Moorland, Scrubland	N	
Green Roofs	N	
Institutional Grounds	N	
Orchards	S	If entrance fee/restricted access
Outdoor Sports Facilities	A	
Parks, Public Gardens & Recreation Grounds	S	If entrance fee/restricted access
Private Domestic Gardens	N	
Street Trees	N	
Water Bodies	S	If entrance fee/restricted access
Water Courses	N	
Wetlands	N	
Woodlands	S	If entrance fee/restricted access

Does each type below perform: **SHADING FROM THE SUN**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	If trees/hedges present
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	S	If significant tree cover
Incidental Green Space	S	If significant tree cover
Grassland, Heathland, Moorland, Scrubland	S	If significant tree cover
Green Roofs	S	If includes trees
Institutional Grounds	S	If significant tree cover
Orchards	A	
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	S	If significant tree cover
Private Domestic Gardens	S	If significant tree cover
Street Trees	A	
Water Bodies	N	
Water Courses	N	
Wetlands	N	
Woodland	A	

Does each type below perform: **TIMBER PRODUCTION**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	N	
Incidental Green Space	N	
Grassland, Heathland, Moorland, Scrubland	N	
Green Roofs	N	
Institutional Grounds	N	
Orchards	N	
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	N	
Private Domestic Gardens	N	
Street Trees	N	
Water Bodies	N	
Water Courses	N	
Wetlands	N	
Woodlands	A	

Does each type below perform: **TRAPPING AIR POLLUTANTS**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	S	If significant tree cover
Incidental Green Space	S	If significant tree cover
Grassland, Heathland, Moorland, Scrubland	S	If significant tree cover
Green Roofs	S	If significant tree cover
Institutional Grounds	S	If significant tree cover
Orchards	A	
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	S	If significant tree cover
Private Domestic Gardens	S	If significant tree cover
Street Trees	A	
Water Bodies	N	
Water Courses	N	
Wetlands	N	
Woodlands	A	

Does each type below perform: **WATER CONVEYANCE**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	SUDS / Open air drain (MM Anno)
Allotments & Community Gardens	S	SUDS / Open air drain (MM Anno)
Cemeteries, Churchyards & Burial Grounds	S	SUDS / Open air drain (MM Anno)
Incidental Green Space	S	SUDS / Open air drain (MM Anno)
Grassland, Heathland, Moorland, Scrubland	S	SUDS / Open air drain (MM Anno)
Green Roofs	N	
Institutional Grounds	S	SUDS / Open air drain (MM Anno)
Orchards	S	SUDS / Open air drain (MM Anno)
Outdoor Sports Facilities	S	SUDS / Open air drain (MM Anno)
Parks, Public Gardens & Recreation Grounds	S	SUDS / Open air drain (MM Anno)
Private Domestic Gardens	S	SUDS / Open air drain (MM Anno)
Street Trees	N	
Water Bodies	S	SUDS / Open air drain (MM Anno)
Water Courses	A	
Wetlands	S	SUDS / Open air drain (MM Anno)
Woodlands	S	SUDS / Open air drain (MM Anno)

Does each type below perform: **WATER INFILTRATION**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	S	High porosity soils / large trees
Allotments & Community Gardens	S	High porosity soils / large trees
Cemeteries, Churchyards & Burial Grounds	S	High porosity soils / large trees
Incidental Green Space	S	High porosity soils / large trees
Grassland, Heathland, Moorland, Scrubland	S	High porosity soils / large trees
Green Roofs	N	
Institutional Grounds	S	High porosity soils / large trees
Orchards	S	High porosity soils / large trees
Outdoor Sports Facilities	S	High porosity soils / large trees
Parks, Public Gardens & Recreation Grounds	S	High porosity soils / large trees
Private Domestic Gardens	S	High porosity soils / large trees
Street Trees	S	High porosity soils / large trees
Water Bodies	N	
Water Courses	N	
Wetlands	N	
Woodlands	S	High porosity soils / large trees

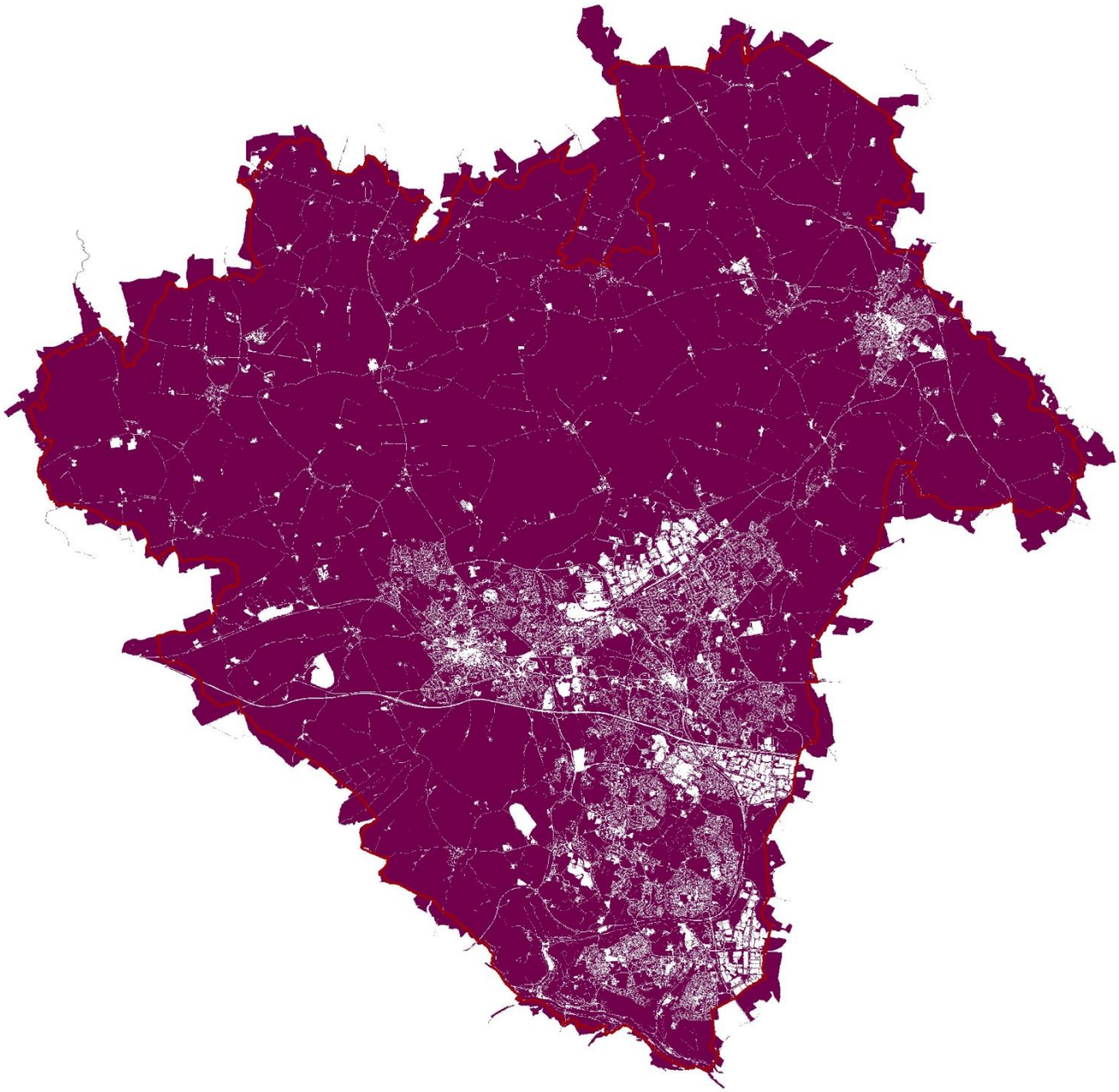
Does each type below perform: **WATER INTERCEPTION**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	S	If significant tree cover
Incidental Green Space	S	If significant tree cover
Grassland, Heathland, Moorland, Scrubland	N	
Green Roofs	N	
Institutional Grounds	S	If significant tree cover
Orchards	S	If significant tree cover
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	N	
Private Domestic Gardens	S	If significant tree cover
Street Trees	S	If significant tree cover
Water Bodies	N	
Water Courses	N	
Wetlands	N	
Woodlands	A	

Does each type below perform: **WIND SHELTER**	**Always (A), Sometimes (S), Never (N)**	**If Sometimes, under what circumstances is it performed – a threshold**
Agricultural Land	N	
Allotments & Community Gardens	N	
Cemeteries, Churchyards & Burial Grounds	S	If significant tree cover
Incidental Green Space	S	If significant tree cover
Grassland, Heathland, Moorland, Scrubland	S	If significant tree cover
Green Roofs	S	If trees present
Institutional Grounds	S	If significant tree cover
Orchards	A	
Outdoor Sports Facilities	N	
Parks, Public Gardens & Recreation Grounds	S	If significant tree cover
Private Domestic Gardens	S	If significant tree cover
Street Trees	A	
Water Bodies	N	
Water Courses	N	
Wetlands	N	
Woodlands	A	

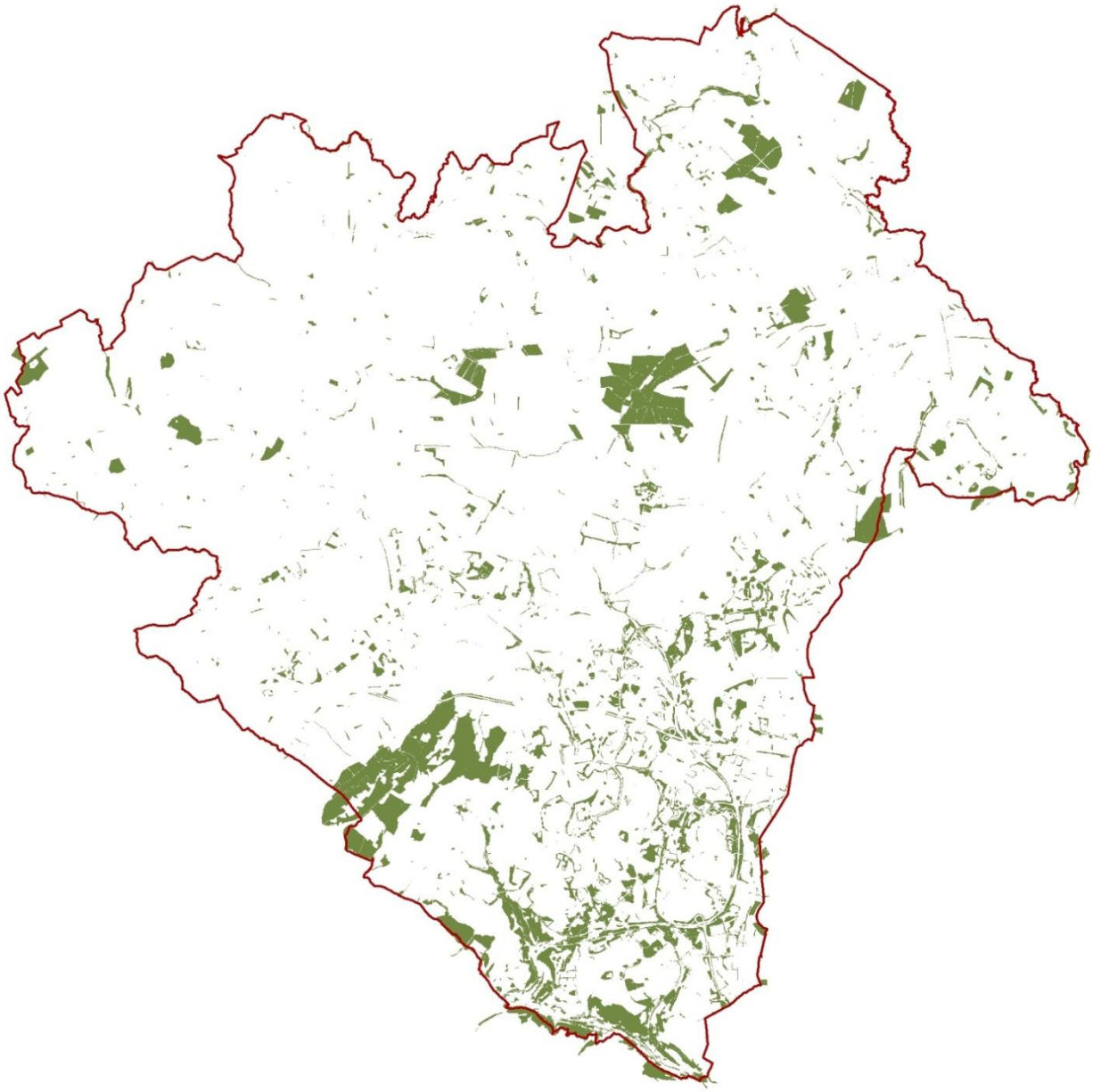
Appendix 5: Function Maps

Accessible Water Storage Function

Aesthetic Function

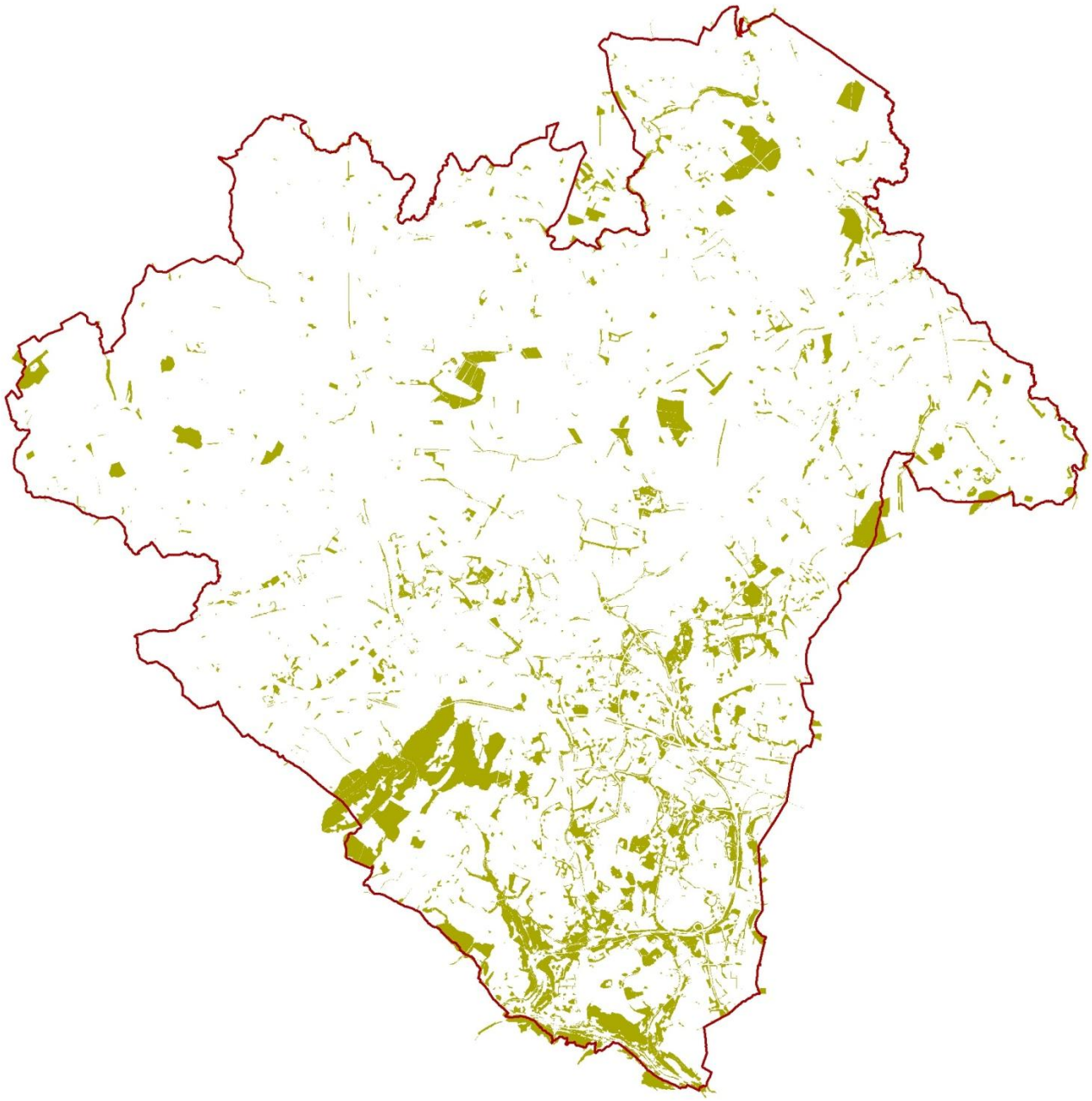


Biofuels Production Function

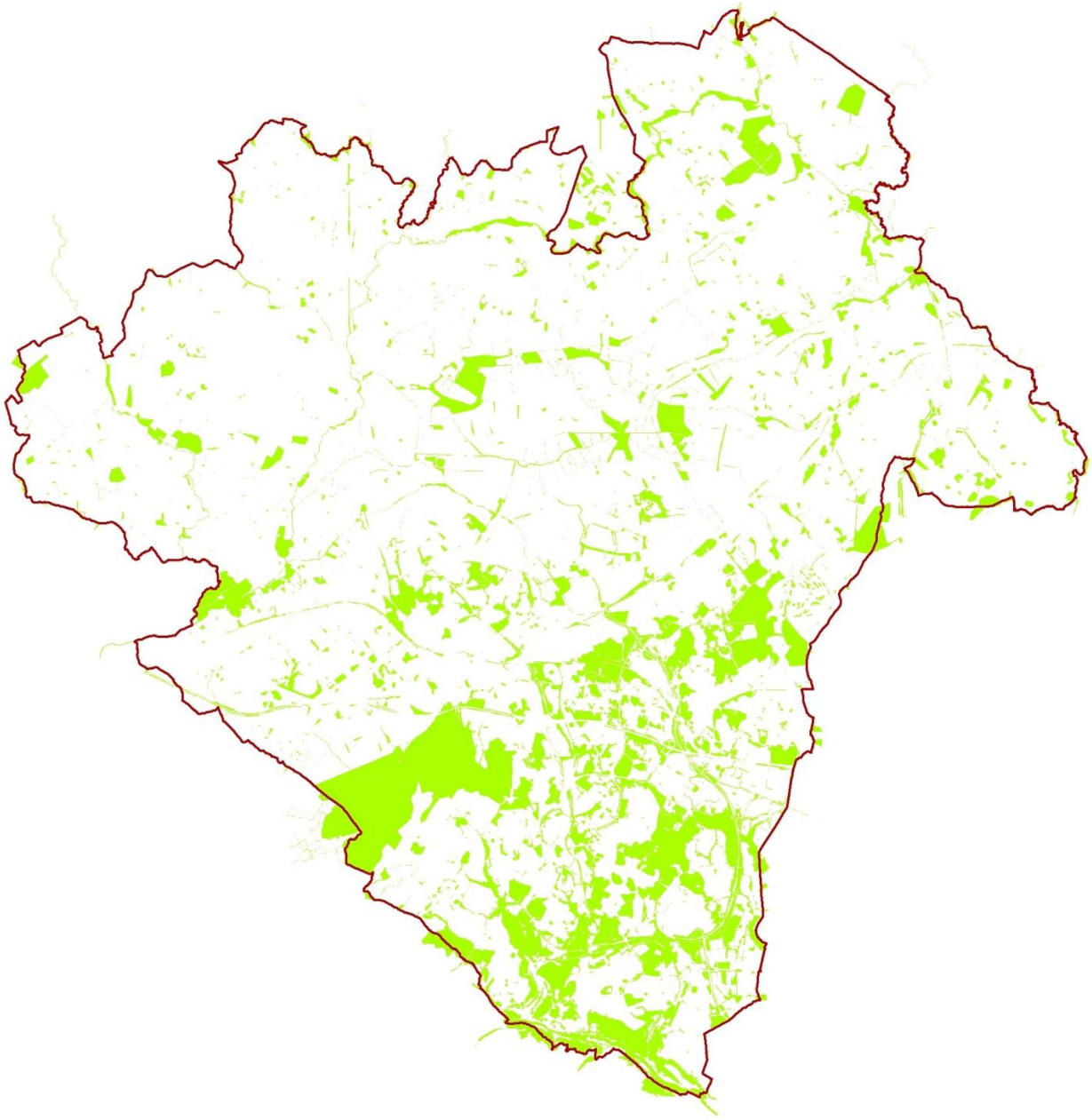


Burial Space Function

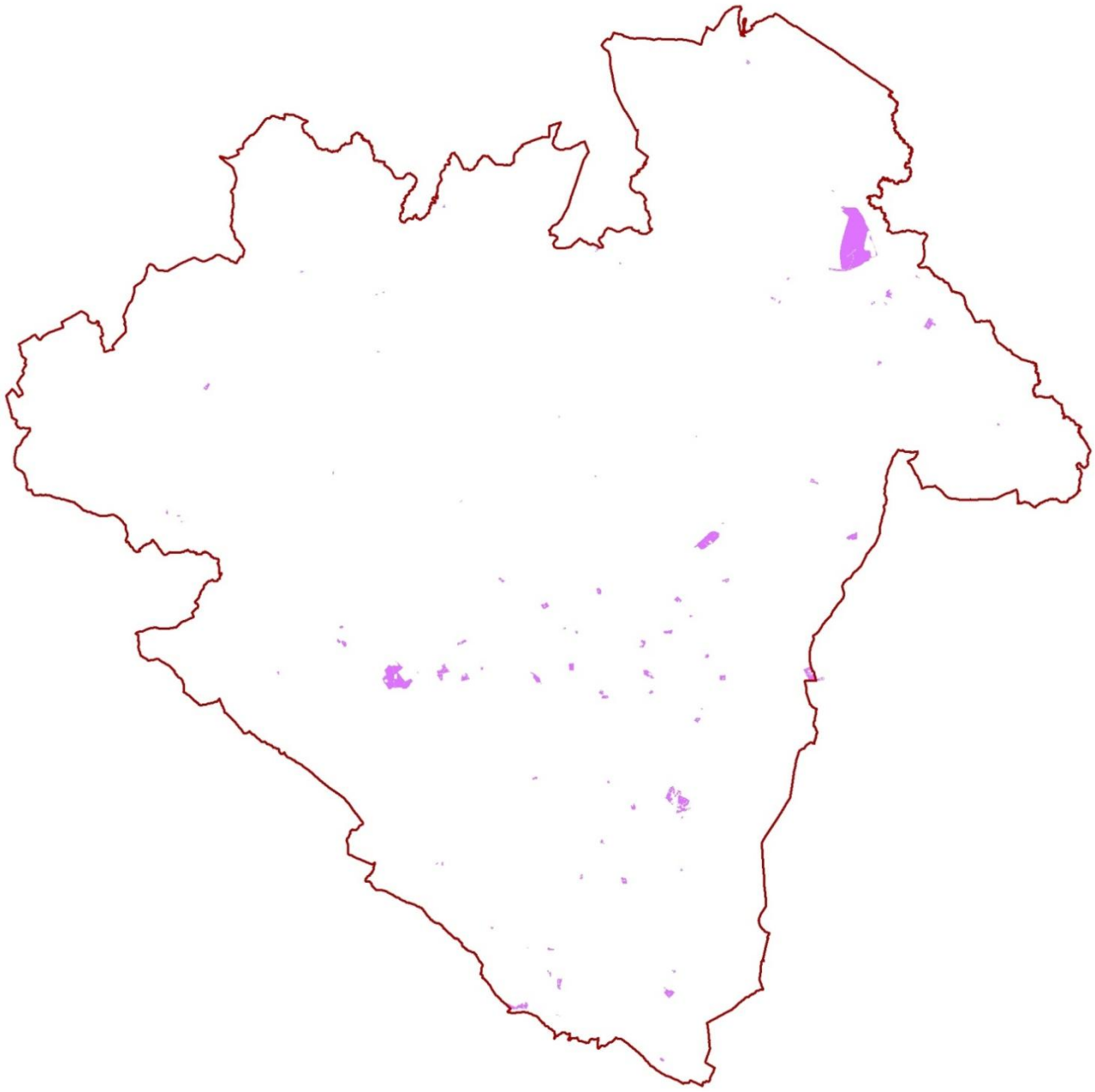
Carbon Storage Function



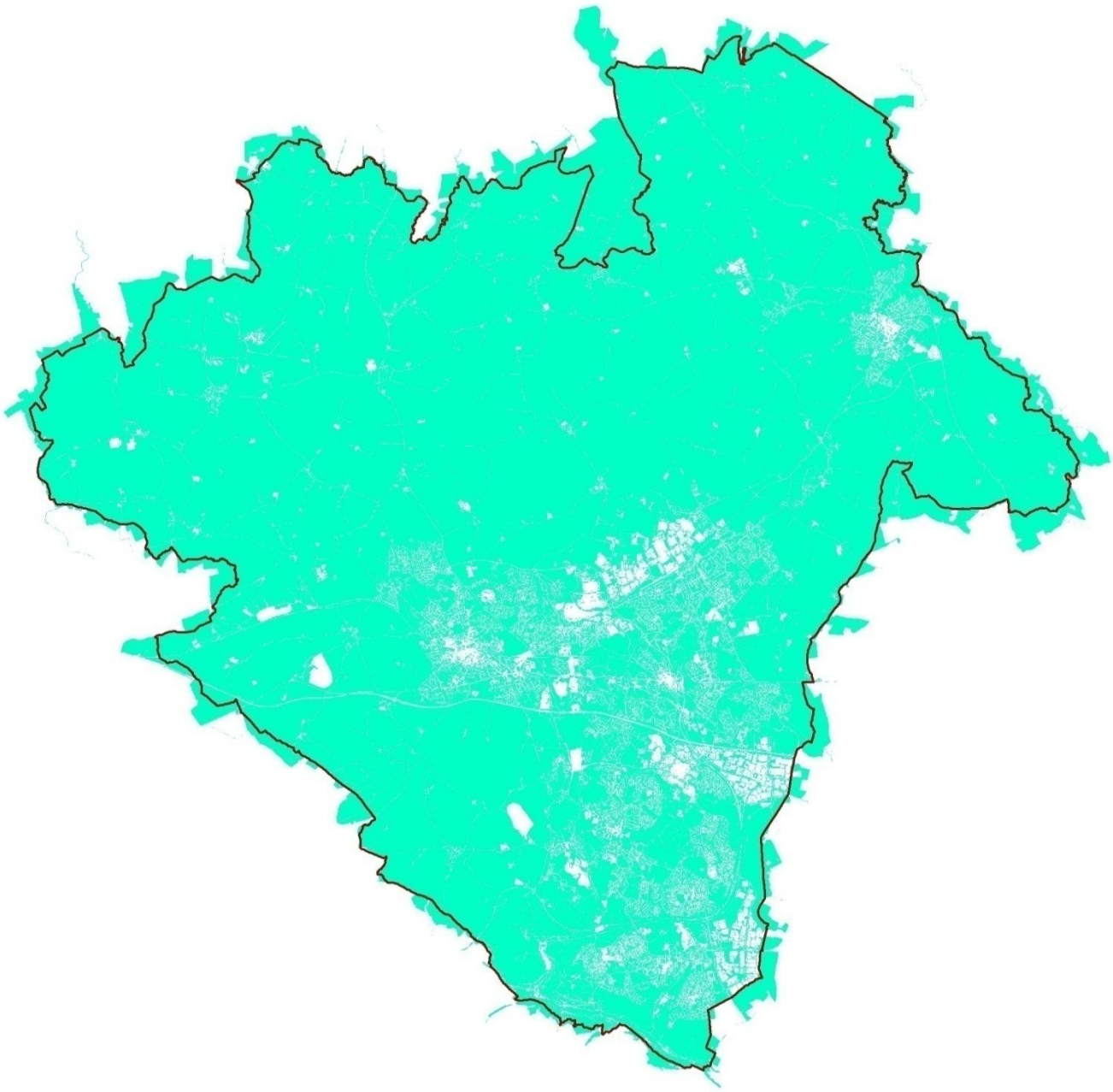
Corridor for Wildlife Function



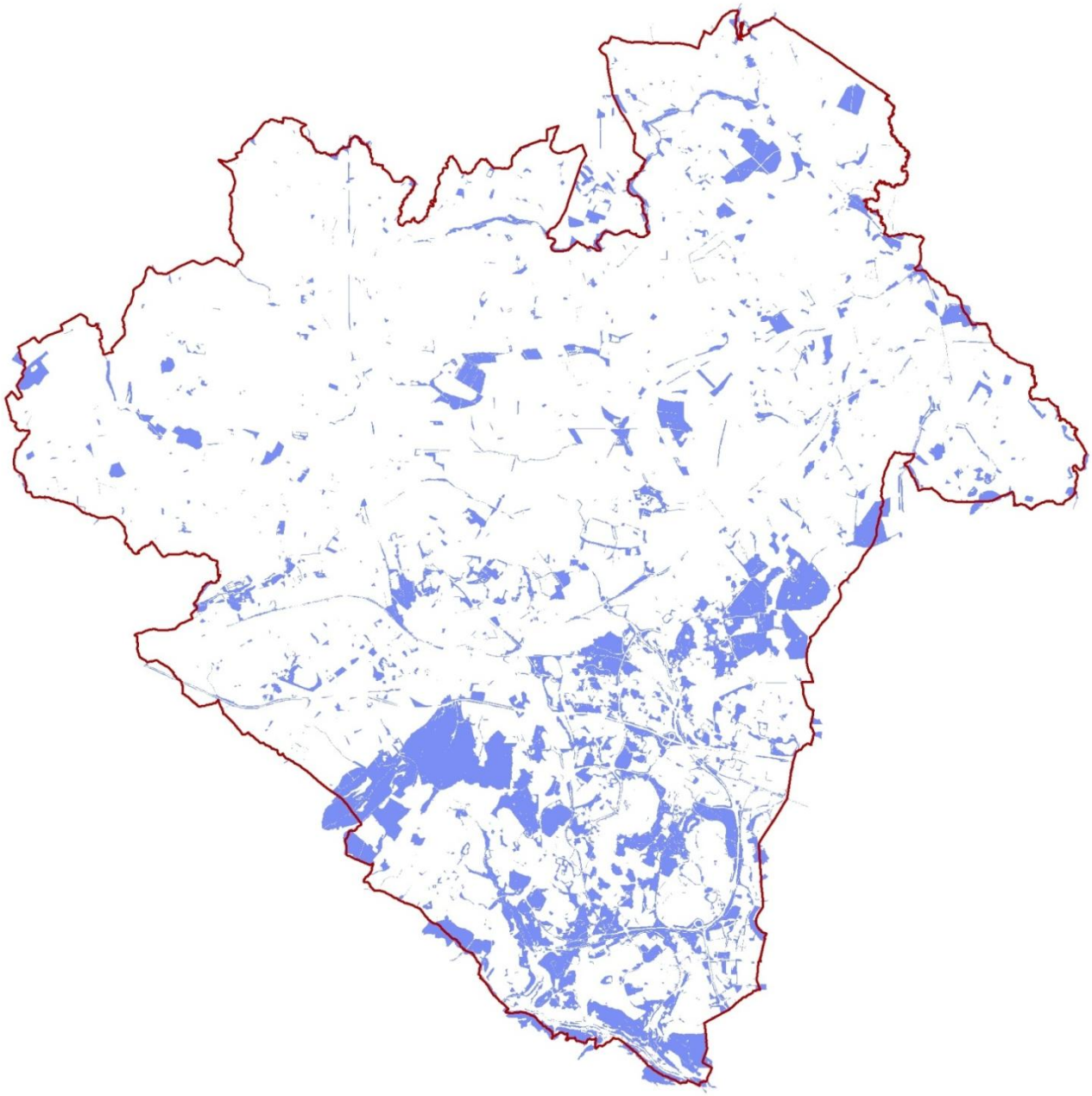
Cultural Asset Function



Evaporative Cooling Function



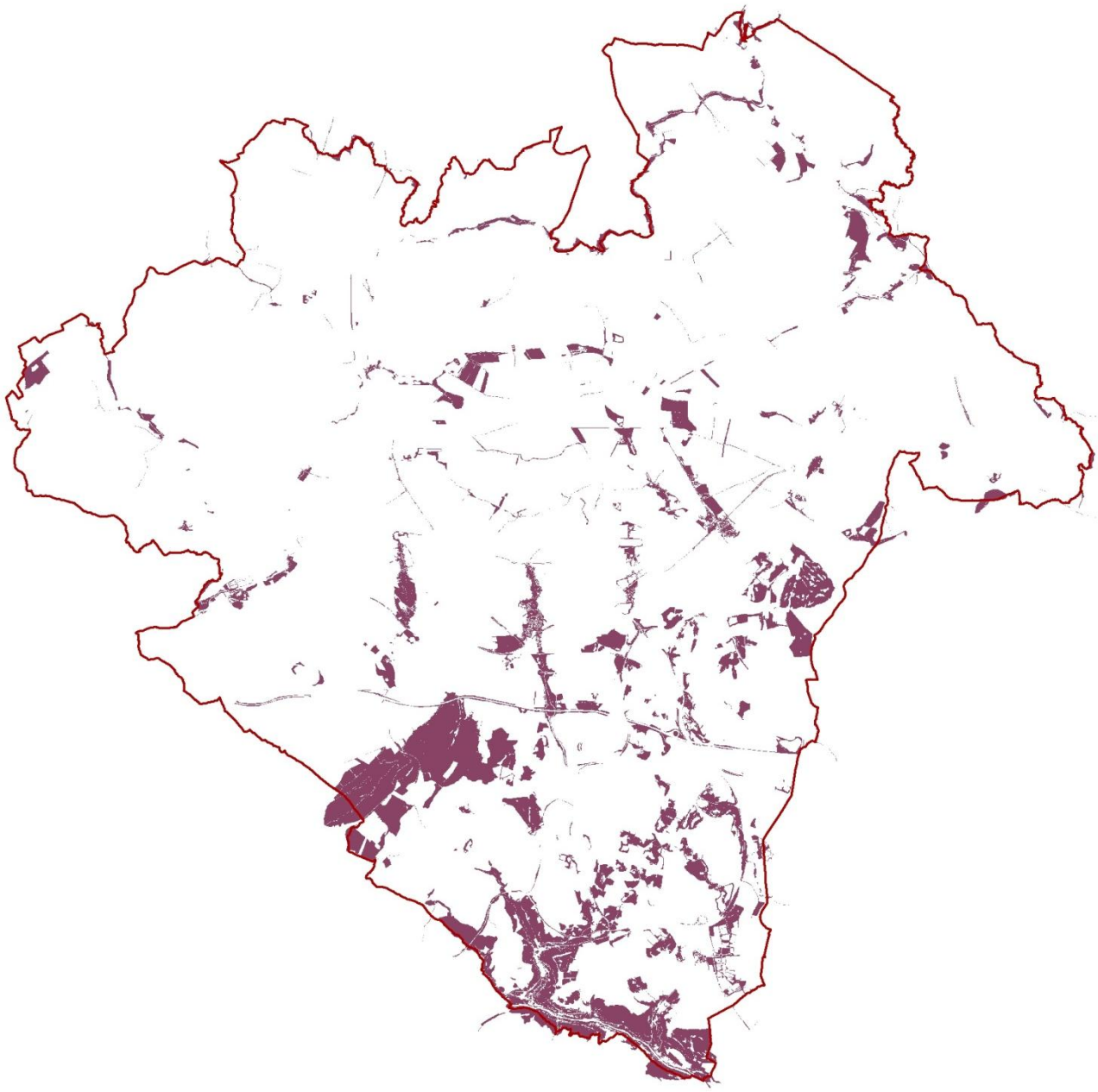
Flow Reduction through Surface Roughness Function



Food Production Function

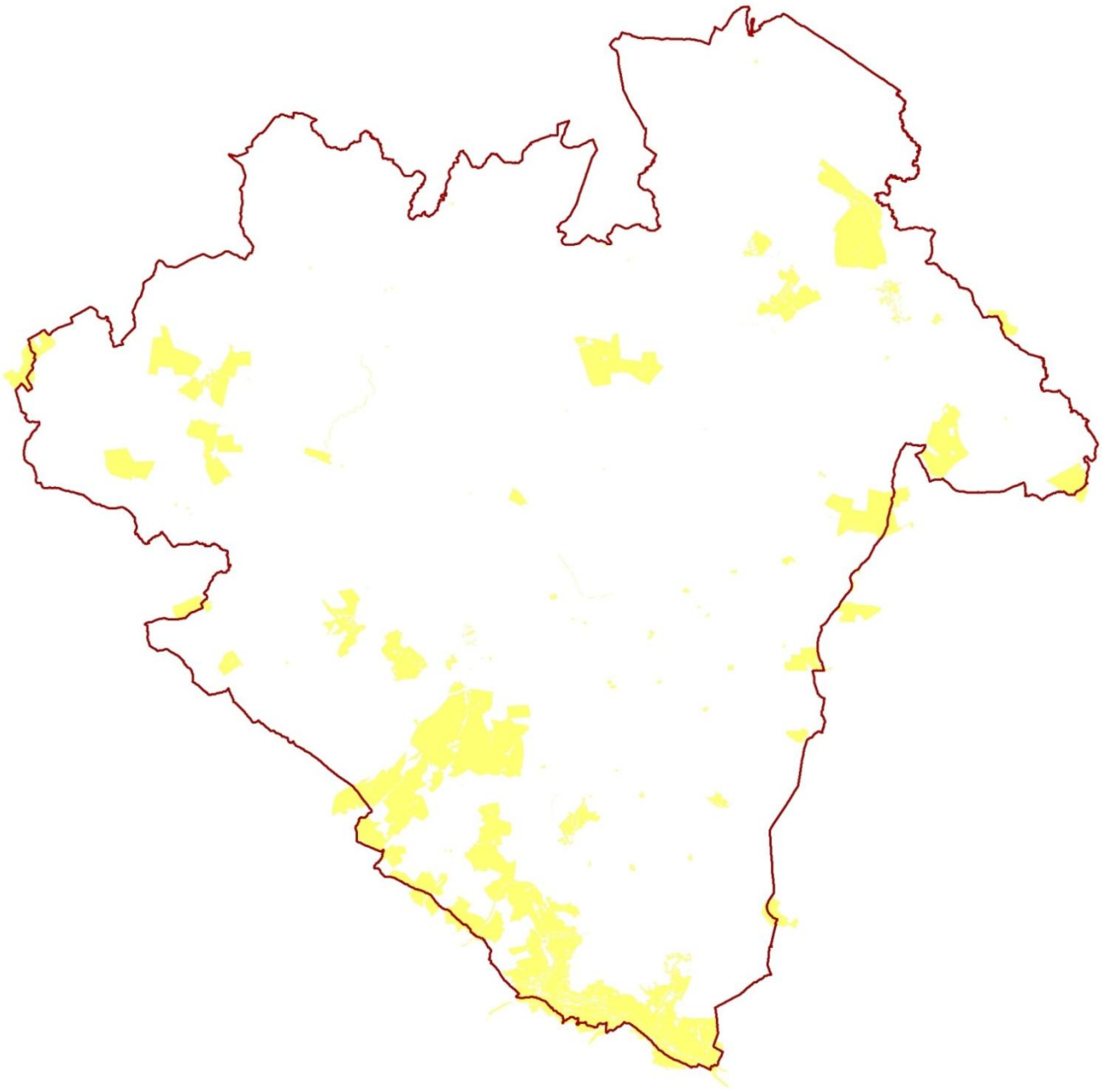
Green Travel Route Function

Ground Stabilisation Function

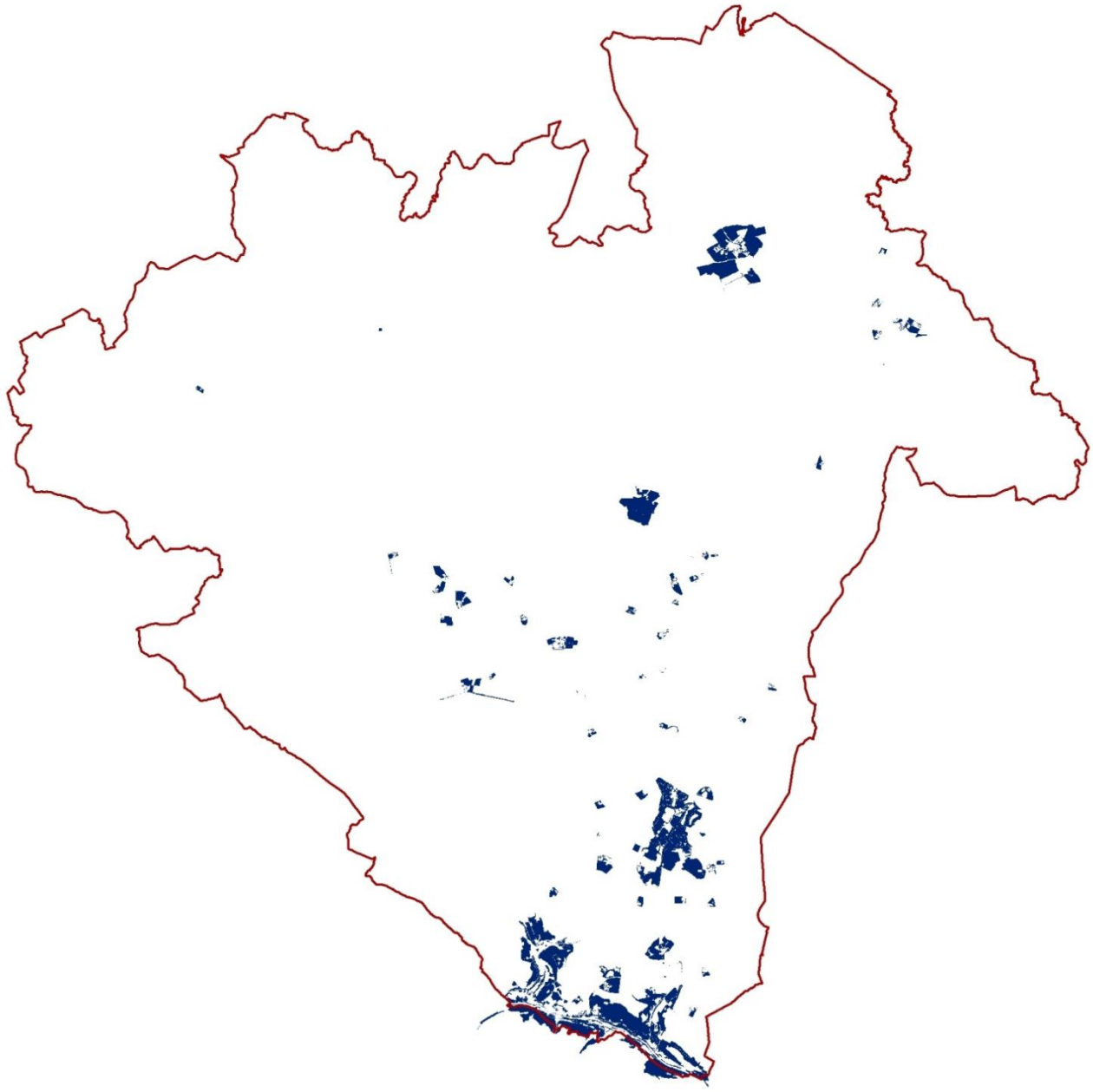


Habitat for Wildlife Function

Heritage Function

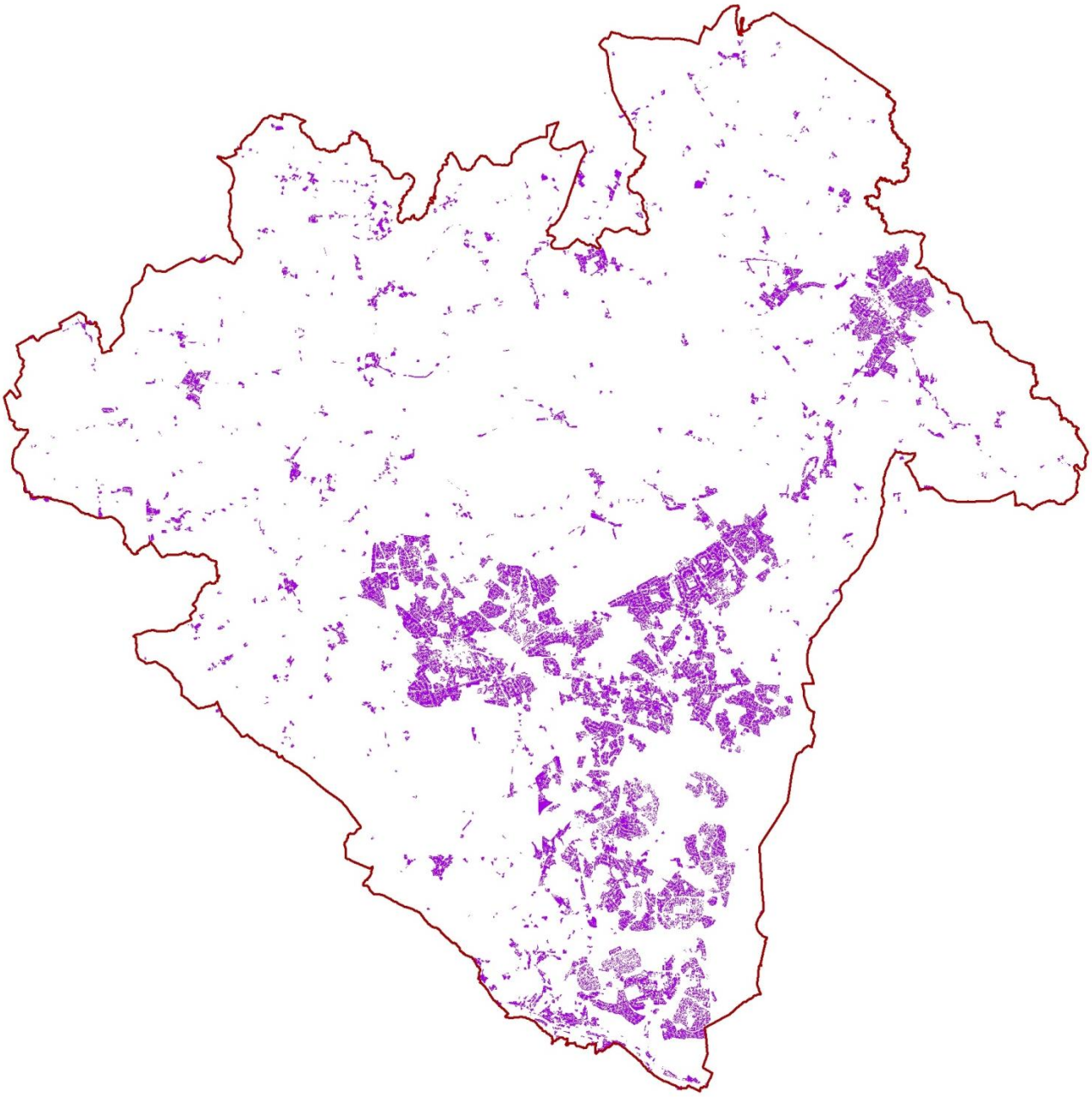


Learning Function

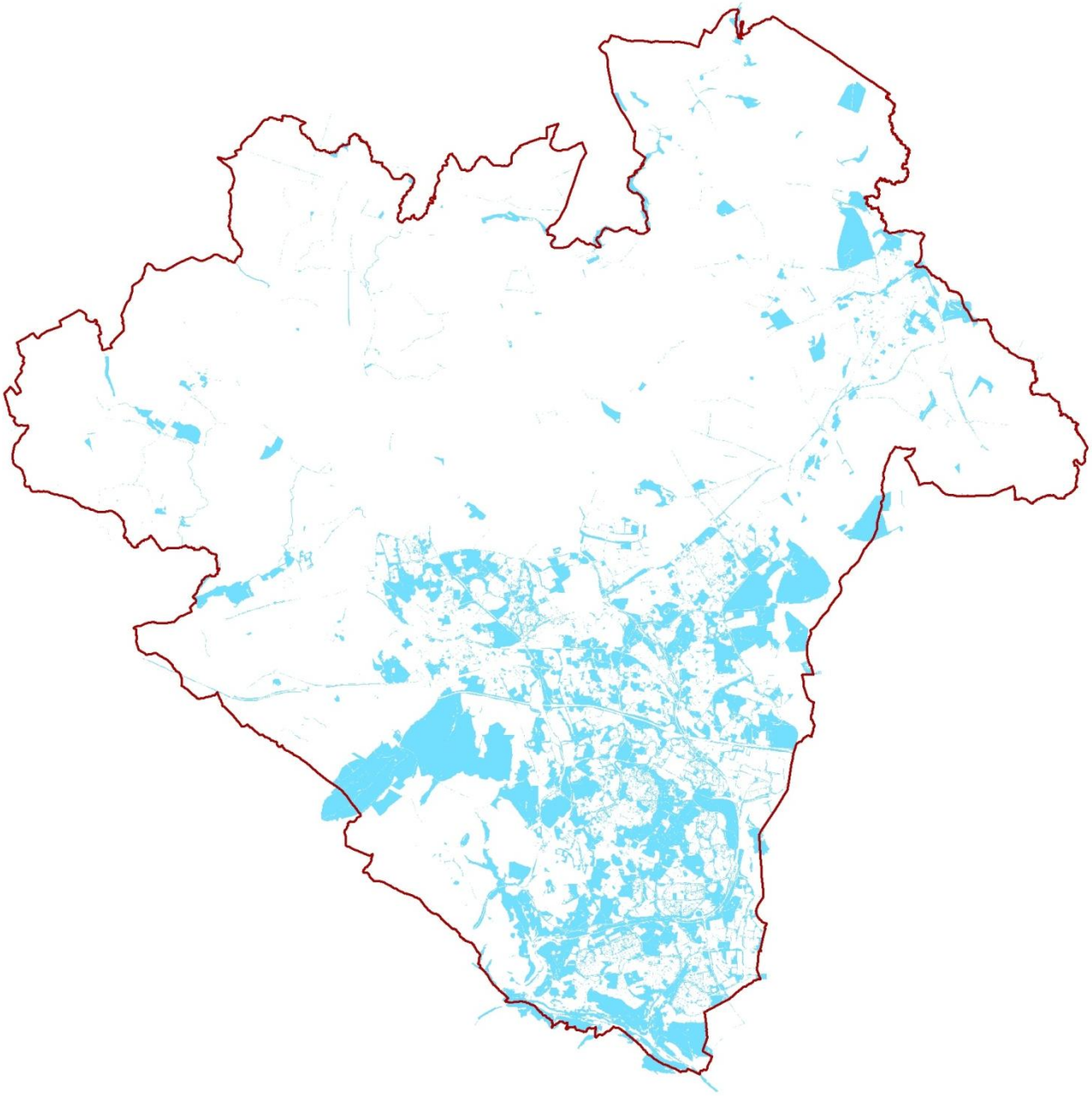


Noise Absorption Function

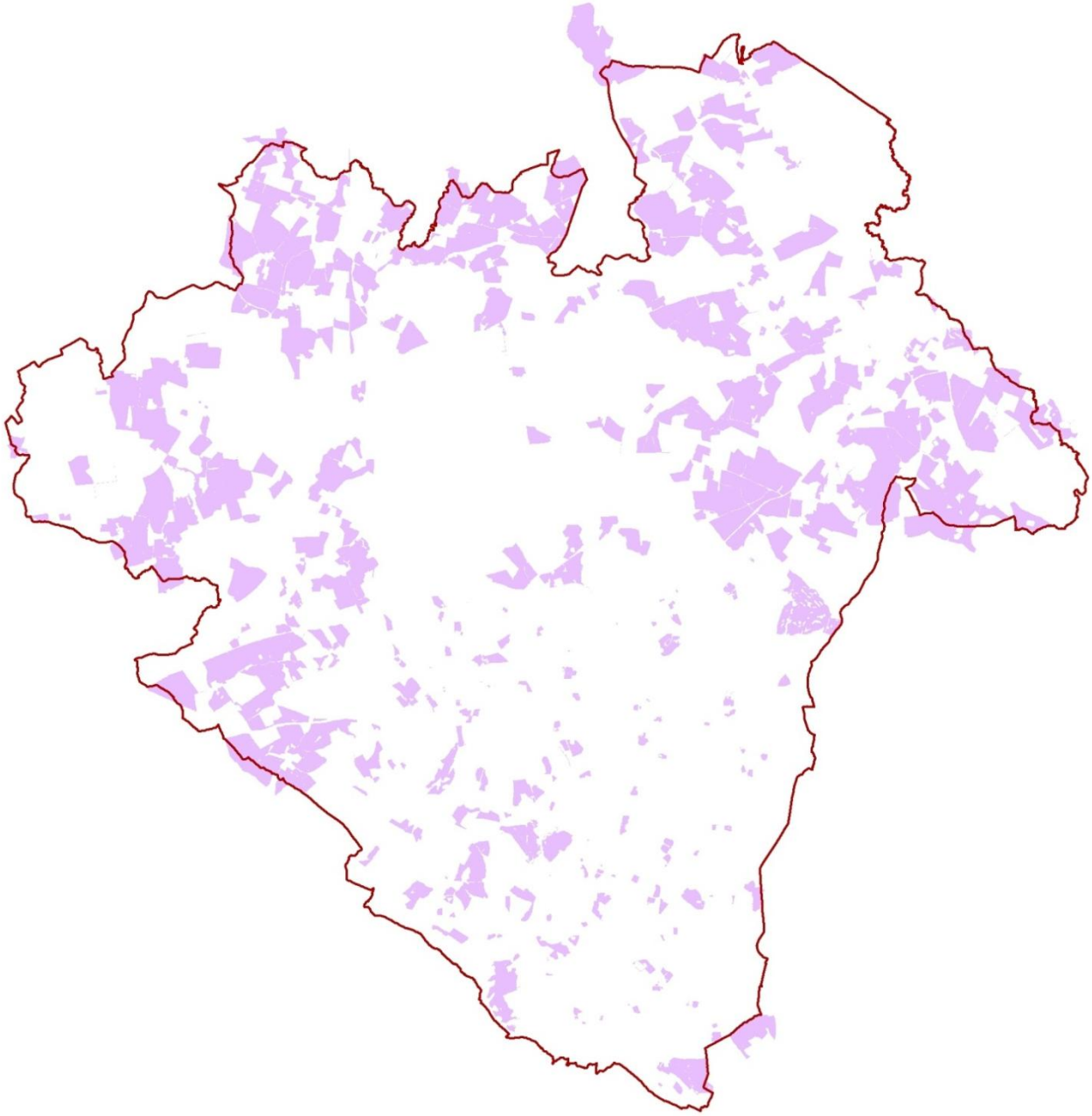
Private Recreation Function



Public Recreation Function



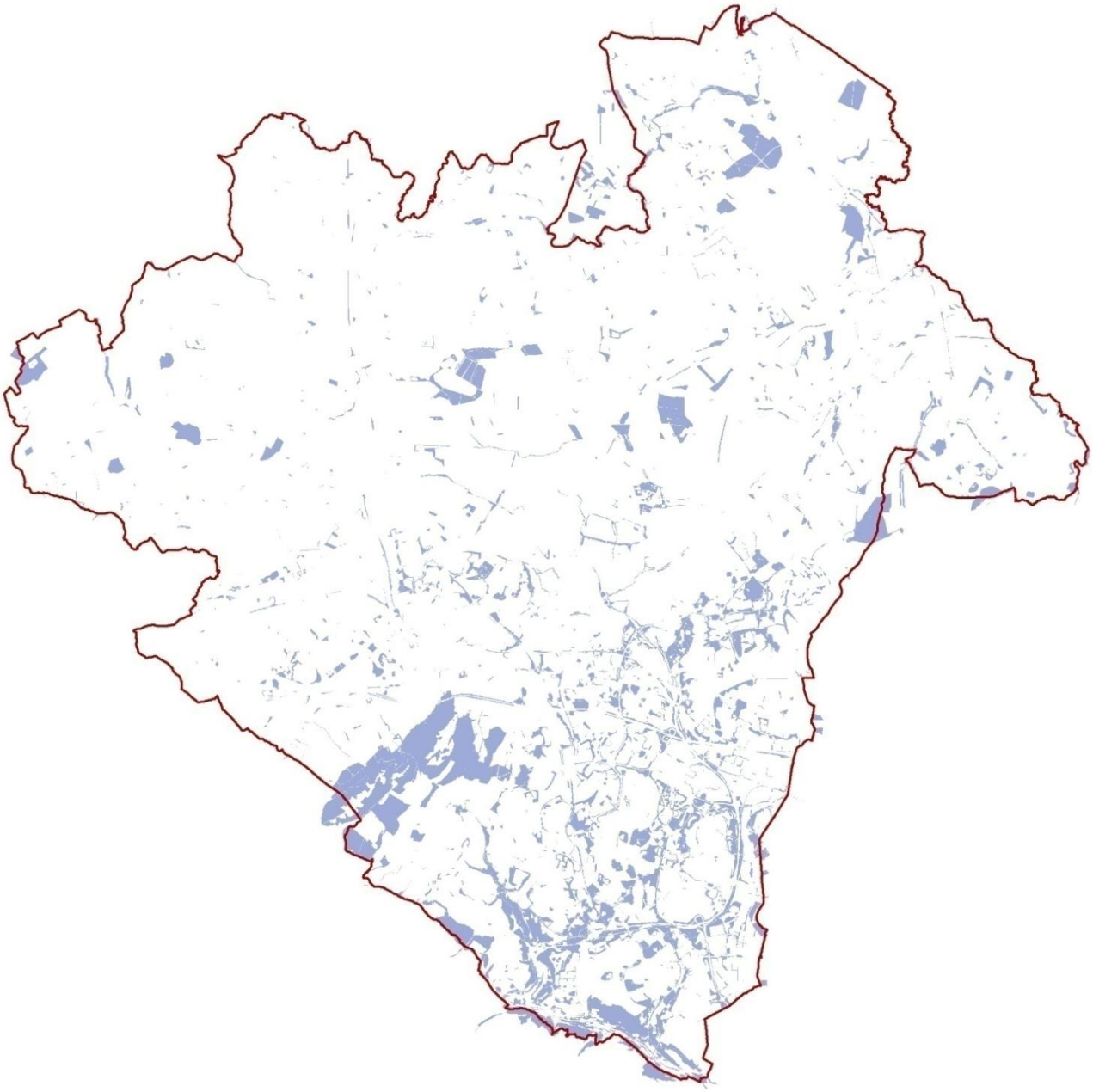
Public Recreation with Restrictions Function



Shading from the Sun Function

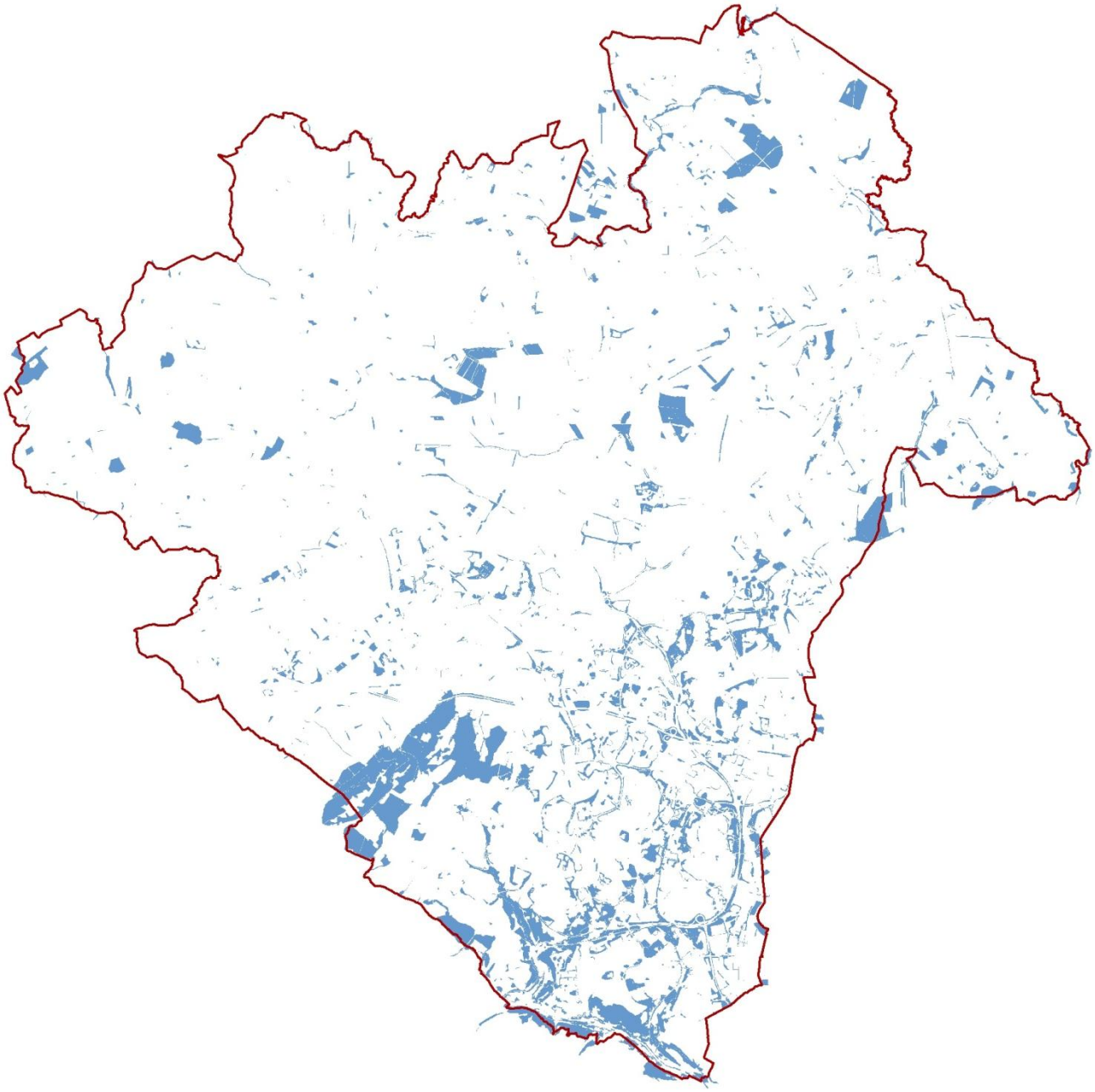
Timber Production Function

Trapping Air Pollutants Function

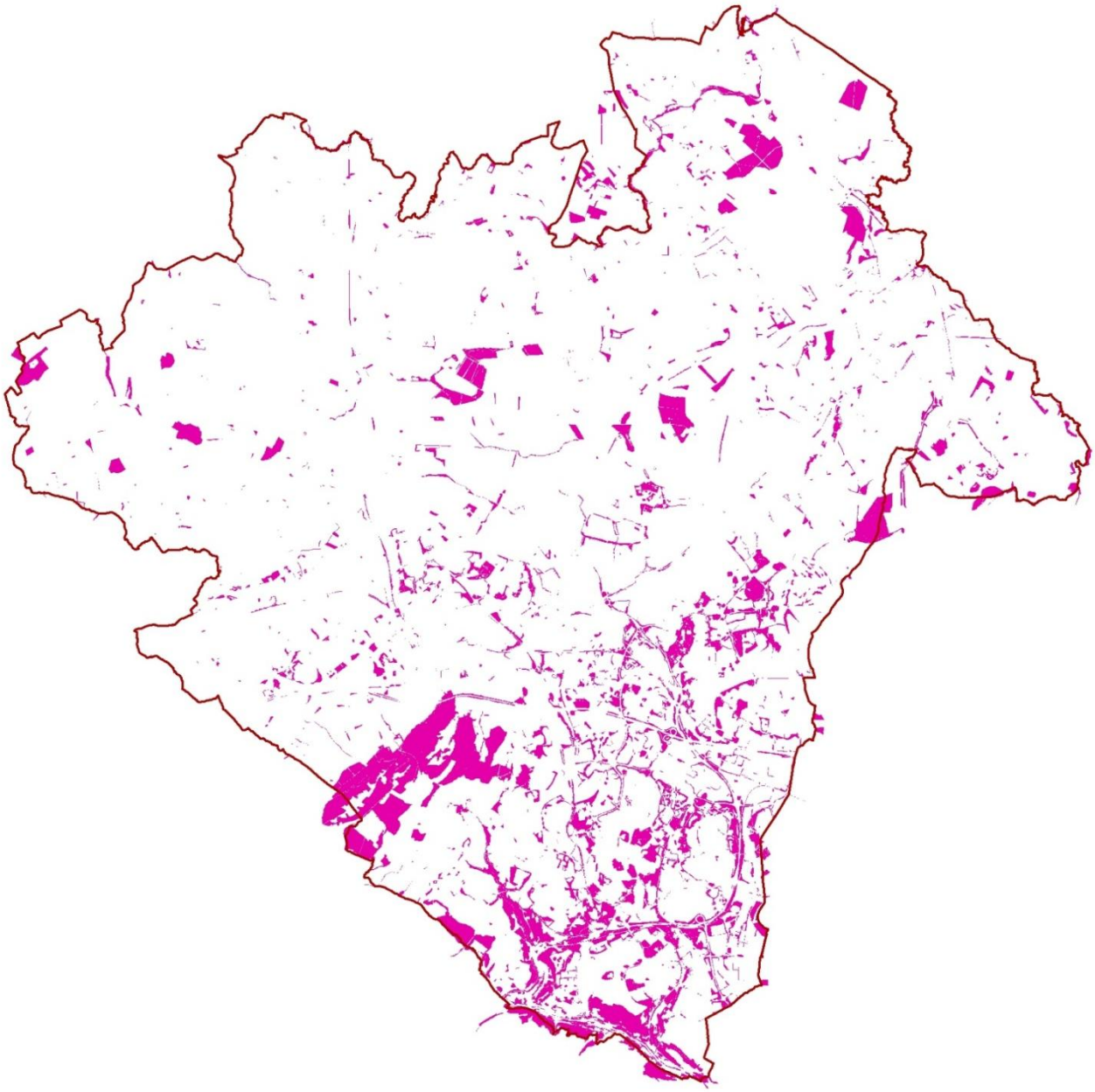


Water Conveyance Function

Water Interception Function



Wind Shelter Function



Appendix 6: Quality Assessment of Data Behind Each Function Map

Aesthetic

Datasets used	Green Infrastructure Typology dataset: Telford & Wrekin Green Infrastructure Framework
Date of data	2011
Quality of data used	High
Confidence in final map	Medium • All green infrastructure was presumed to perform the aesthetic function. It is accepted that in reality not all areas of green infrastructure will perform the aesthetic function. However, defining when green infrastructure does perform the aesthetic function is difficult. This is an area of work which will be highlighted in the areas for action

Accessible Water Storage

Datasets used	Telford & Wrekin Council: Aerial photography
Date of data	2010
Quality of data used	High
Confidence in final map	High

Biofuels Production

Datasets used	Natural England: Energy Crops
Date of data	2011
Quality of data used	High
Confidence in final map	High

Burial Space

Datasets used	Green Infrastructure Typology dataset: Telford & Wrekin Green Infrastructure Framework
Date of data	2011
Quality of data used	High
Confidence in final map	High

Carbon Storage

Datasets used	Green Infrastructure Typology dataset: Telford & Wrekin Green Infrastructure Framework
Date of data	2011
Quality of data used	Medium
Confidence in final map	Medium • No data collected for the mapping of peat and other carbon rich soils. • No data collected to show where significant tree cover on types Incidental Green Space, Institutional Grounds and Private Domestic Gardens

Corridor for Wildlife

Datasets used	Natural England: Environmental Stewardship Schemes and Countryside Stewardship Schemes Telford & Wrekin Council: Local Nature Reserves Telford & Wrekin Council: SSSI Telford & Wrekin Council: AONB Telford & Wrekin Council: Land management (grass cuts)
Date of data	2011
Quality of data used	High
Confidence in final map	High

Cultural Asset

Datasets used	Green Infrastructure Typology dataset: Telford & Wrekin Green Infrastructure Framework Telford & Wrekin Council: Village green
Date of data	2011
Quality of data used	High
Confidence in final map	Medium • No data collected to show where green infrastructure is within museum grounds • No data collected to show where A3/A4 land use class

Evaporative Cooling

Datasets used	Green Infrastructure Typology dataset: Telford & Wrekin Green Infrastructure Framework
Date of data	2011
Quality of data used	High
Confidence in final map	High

Flow Reduction through Surface Roughness

Datasets used	LIDAR (Light Detection And Ranging) slope data
Date of data	2011
Quality of data used	High
Confidence in final map	High

Food Production

Datasets used	Telford & Wrekin Council: Fishing licences Natural England: Agricultural Land Classification
Date of data	2011

Quality of data used	High
Confidence in final map	High

Green Travel Route

Datasets used	Ordnance Survey: Open data A road, B road, motorways Telford & Wrekin Council: Public Rights of Way Network Sustrans: National and Regional routes
Date of data	2011
Quality of data used	High
Confidence in final map	High

Ground Stabilisation

Datasets used	LIDAR (Light Detection And Ranging) slope data Environment Agency: Flood Zones
Date of data	2011
Quality of data used	High
Confidence in final map	High

Habitat for Wildlife

Datasets used	Natural England: Environmental Stewardship Schemes and Countryside Stewardship Schemes Telford & Wrekin Council: Local Nature Reserves Telford & Wrekin Council: SSSI Telford & Wrekin Council: AONB Telford & Wrekin Council: Land management (grass cuts)
Date of data	2011
Quality of data used	High
Confidence in final map	High

Heritage

Datasets used	Telford & Wrekin Council: World Heritage Site Telford & Wrekin Council: Conservation Area Telford & Wrekin Council: Scheduled Ancient Monuments English Heritage: Historic Parks and Gardens Telford & Wrekin Council: Ancient woodland, Trees Natural England: Traditional Orchards
Date of data	2000
Quality of data used	High
Confidence in final map	High

Inaccessible Water Storage

Datasets used	Not mapped
Date of data	N/A
Quality of data used	Not mapped – Low
Confidence in final map	Not mapped – Low • No data collected for soil type • No data for SUDS locations

Learning

Datasets used	Telford & Wrekin Council: Hoo Farm Boundary Telford & Wrekin Council: Harper Adams Boundary Telford & Wrekin Council: Schools
Date of data	2011
Quality of data used	Medium
Confidence in final map	Medium • No data collected on visitor centre location • No data collected on ranger/skills groups

Noise Absorption

Datasets used	Ordnance Survey: Mastermap Railway lines, A roads, B Roads
Date of data	2011
Quality of data used	Medium
Confidence in final map	Medium • No data collected to show where significant tree cover on types Grassland, Heathland, Moorland, Scrubland, Incidental Green Space, Institutional Grounds and Private Domestic Gardens

Pollutant Removal from Soil/Water

Datasets used	Not mapped
Date of data	N/A
Quality of data used	Not mapped – Low
Confidence in final map	Not mapped – Low • No data collected to show where SUDS located • No data collected to show levels of vegetation coverage

Recreation – Private

Datasets used	Telford & Wrekin Council: Council Ownership
Date of data	2011
Quality of data used	High
Confidence in final map	High

Recreation – Public

Datasets used	Telford & Wrekin Council: Public rights of Way Network Telford & Wrekin Council: Open Spaces Sustrans: National and Regional Routes Telford & Wrekin Council: Green Network Designation

Date of data	2011
Quality of data used	High
Confidence in final map	High

Recreation – Public with Restrictions

Datasets used	Telford & Wrekin Council: Public rights of Way Network
Date of data	2011
Quality of data used	Medium
Confidence in final map	Medium • No data collected on where entrance fees/restricted access apply for Allotments & Community Gardens, Orchards, Parks, Public Gardens & Recreation Grounds, Water Bodies and Woodlands

Shading from the Sun

Datasets used	Green Infrastructure Typology dataset: Telford & Wrekin Green Infrastructure Framework Telford & Wrekin Council: Hedges
Date of data	2011
Quality of data used	High
Confidence in final map	Medium • No data collected to show where significant tree cover on types Grassland, Heathland, Moorland, Scrubland, Incidental Green Space, Institutional Grounds and Private Domestic Gardens

Timber Production

Datasets used	Green Infrastructure Typology dataset: Telford & Wrekin Green Infrastructure Framework Telford & Wrekin Council: Hedges
Date of data	2011

Quality of data used	High
Confidence in final map	High

Trapping Air Pollutants

Datasets used	Green Infrastructure Typology dataset: Telford & Wrekin Green Infrastructure Framework
Date of data	2011
Quality of data used	High
Confidence in final map	Medium • No data collected to show where significant tree cover on types Grassland, Heathland, Moorland, Scrubland, Incidental Green Space, Institutional Grounds and Private Domestic Gardens

Water Conveyance

Datasets used	Ordnance Survey: Mastermap –where open air drain
Date of data	2011
Quality of data used	High
Confidence in final map	Medium • No data collected to show where SUDS located

Water Infiltration

Datasets used	Not mapped
Date of data	N/A
Quality of data used	Not mapped – Low
Confidence in final map	Not mapped – Low • No data collected to show where high porosity soils located • No data to show where large trees located

Water Interception

Datasets used	Green Infrastructure Typology dataset: Telford & Wrekin Green Infrastructure Framework
Date of data	2011
Quality of data used	High
Confidence in final map	Medium • No data collected to show where significant tree cover on types Grassland, Heathland, Moorland, Scrubland, Incidental Green Space, Institutional Grounds and Private Domestic Gardens

Wind Shelter

Datasets used	Green Infrastructure Typology dataset: Telford & Wrekin Green Infrastructure Framework
Date of data	2011
Quality of data used	High
Confidence in final map	Medium • No data collected to show where significant tree cover on types Grassland, Heathland, Moorland, Scrubland, Incidental Green Space, Institutional Grounds and Private Domestic Gardens

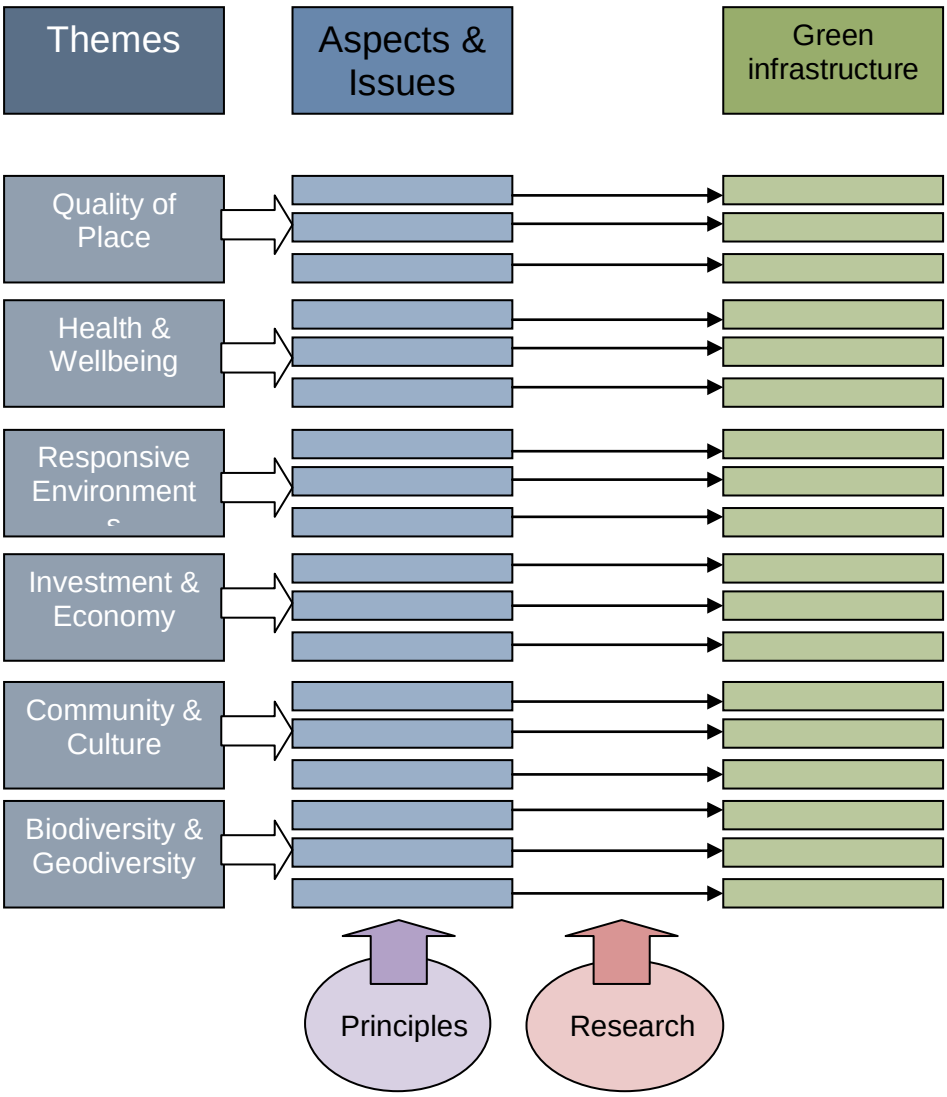
Appendix 7: Principles

The vision of a successful place (and successful green infrastructure) has been organised around the following 6 themes:

- Quality of Place
- Health & Wellbeing
- Responsive Environments
- Investment & Economy
- Community & Culture
- Biodiversity & Geodiversity

Each theme has been broken down into the components which make up each of those themes (these are called aspects).

Figure 1 How the Themes, aspects and issues are related



This section explains the ***principles*** which have been used to identify issues which are related to each aspect. The source of those principles is sustainability.

Sustainability

The vision for the borough of Telford & Wrekin is to be a successful place. A successful place is a sustainable place, i.e. it is a place which is shaped by the concept and philosophy of sustainability and the application of sustainable principles. Since green infrastructure is an integral part of a place the Green Infrastructure Framework is shaped and directed by the same concept, philosophy and principles

which determine the overall quality of a place.

The concept and philosophy of Sustainability is:

- Establishing and sustaining a balance between social well being, economic vitality and viability and protecting the environment
- Achieving and sustaining a balance in such a way that it not only preserves human life but enables the ability of future generations to enjoy the same or a greater quality of life as current generations.

Sustainable Principles

Sustainable principles are based upon :

- Achieving and sustaining social, economic and environmental needs
- Achieving and sustaining social, economic and environmental needs in ways which achieves a balance across all three i.e. the pursuit of one is not conducted at the expense or detriment of the other two.

For the purposes of the Green Infrastructure Framework the terms 'social sustainability', 'economic sustainability' and 'environmental sustainability' are defined as the way in which those themes can be sustained ***and*** the way in which they can be sustained in balance with each other.

The following sustainable principles are based upon the DEFRA Guiding principles for sustainable development[1]. '*The goal of living within environmental limits and a just society will be achieved by means of a sustainable economy, good governance, and sound science*.'

[1] DERFA (2011) Guiding principles for sustainable development

The Five Shared Principles

Living Within Environmental Limits

Respecting the limits of the planet's environment, resources and biodiversity – to improve and safeguard our environment and ensure that the natural resources needed for life are unimpaired and remain so for future generations.

Ensuring a Strong, Healthy and Just Society

Meeting the diverse needs of all people in existing and future communities, promoting personal health and wellbeing, social cohesion and inclusion, and creating equal opportunity for all.

Achieving a Sustainable Economy

Building a strong, stable and sustainable economy which provides prosperity and opportunities for all, and are pursued in ways which are not to the detriment of environmental and social needs

Using Sound Science Responsibly

Ensuring that actions are undertaken on the basis of a sound scientific, technical and ecological basis as well as public attitudes and values.

Promoting Good Governance

Actively promoting effective, participative systems of governance in all levels of society – engaging people's creativity, energy, and diversity.

Appendix 8: Evidence and Justification behind Key Issues from Quality of Place

Providing for People

Telford & Wrekin contains a wide variety of green infrastructure and this is evident from the typology and function mapping. There are correspondingly high variations in the ability of the public to access green infrastructure. The rural area for example contains a predominance of agricultural land, the vast majority of which is in private ownership with little or no public access. Telford on the other hand is a planned town with large amounts of green infrastructure intended to be available for public use. The reality is that not all of Telford's green infrastructure will be as publicly accessible as it first appears. There may be physical barriers to accessing much of this land, such as ground conditions, overgrown vegetation, flooding and drainage problems, or access may be restricted, particularly if the land is in private ownership.

Character

Some areas of the borough lack a unique or identifiable identity or character. Telford Town Centre is a particular example of such an area – Telford & Wrekin council's Central Telford Area Action Plan identifies that amongst the issues facing the town centre are the limited mixture of uses and activities, the lack of a social and cultural heart, barriers to safe and attractive pedestrian and cyclist movement and a physical townscape lacking in distinctiveness. The same kinds of issues may apply to many areas of the borough, particularly where development during the New Town era was progressed rapidly and at low cost with little acknowledgement of the local context.

The borough contains a number of sites which have been designated for their natural or historic value. These include conservation areas, local nature reserves and wildlife sites as well as major national or international designations such as the Shropshire Hills Area of Outstanding Natural Beauty which covers the Wrekin hill and the Ironbridge Gorge World Heritage Site. These designated areas are not immune from

development – there were 120 planning applications received for development within the World Heritage Site in 2010 alone, but the key issue is to ensure that development that is permitted respects and reflects the visual qualities of the designated area.

Connections & Circulation

Green infrastructure between residential and employment areas tends to contain major highways which act as a significant barrier for people to travel between the two areas without the use of a car. This is particularly evident throughout the eastern side of Telford where large concentrations of employment at Halesfield, Hortonwood and Stafford Park are separated from residential areas by the A442 Eastern Primary road.

Whilst there are broader initiatives and incentives to encourage people to use sustainable modes of transport (e.g. walking, cycling and public transport) as an alternative to the car, there is currently very little emphasis of using green infrastructure to facilitate the use of these alternatives.

Building Uses & Building Types

Telford & Wrekin has projected levels of housing development of 26,500 new homes up to 2026, with the vast majority – 25,000 – to be accommodated within Telford[2]. Although these are figures from the regional strategy which is scheduled to be abolished with the enactment of the Localism Bill, the figures are based upon the most robust and up to date evidence of housing need and supply currently available. Much of the development land in Telford is based on former New Town land.

In April 2005 The Economist recognised that nature provides cities with services which can be valued, priced, and marketed[3]. Median dwelling prices in Telford &

[2] West Midlands Regional Spatial Strategy Phase 2 Revision and Panel Report -
[3] 'Urban Green Infrastructure: Capturing Ecosystem Value', rudi.net, accesses 28/10/11: Urban Green Infrastructure: Capturing Ecosystem Value | RUDI - Resource for Urban Design Information

Wrekin have been consistently lower than the West Midlands in the period 1996 to 2006[4], so green infrastructure has a vital role to play in raising the value of development in the borough.

Public Realm

The Central Telford Area Action Plan notes that The current function and design of space between buildings in the Central Telford area and particularly in the Town Centre is dominated by serving the needs of motor vehicles, this can separate areas and does not promote social interaction.

[4] Nevin Leather Associates. (2008) Telford & Wrekin Strategic Housing Market Assessment

Appendix 9: Evidence and Justification behind Key Issues from Health & Wellbeing

General

Barriers to Improving Health

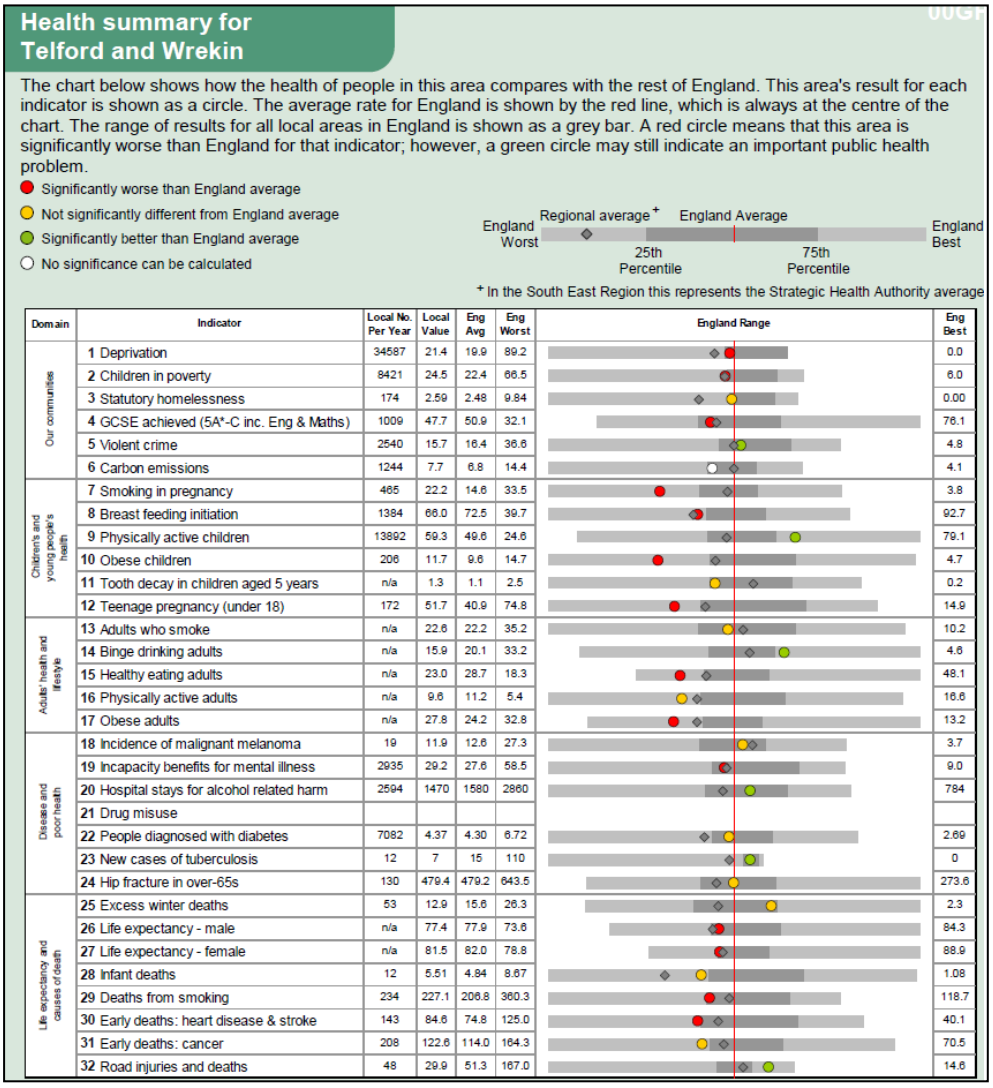
One of the key ways to improve health is to increase people's physical activity. Telford was designed as a new town in the 1960's and 1970's, the design of the town is based on the American "Radburn" design. The Radburn concept was a "Town for the Motor Age"[5], it is very focused on movement around the town by car. Therefore within urban Telford the promotion on active lifestyles meets with more challenges than other areas.

Joint Strategic Needs Assessment

Each local authority and PCT must undertake a Joint Strategic Needs Assessment (JSNA) for their area. JSNA identifies current and future health issues of the local population. In Telford & Wrekin these issues reflect the national health issues affecting the UK. In general, the health of people in Telford & Wrekin is generally poorer than the average for England with the borough performing statistically worse across 14 of the 32 health indicators, see Figure 2.

[5] http://www.radburn.org/geninfo/history.html

Figure 2 Health Summary for Telford & Wrekin[6]



Health summary for Telford and Wrekin

The chart below shows how the health of people in this area compares with the rest of England. This area's result for each indicator is shown as a circle. The average rate for England is shown by the red line, which is always at the centre of the chart. The range of results for all local areas in England is shown as a grey bar. A red circle means that this area is significantly worse than England for that indicator; however, a green circle may still indicate an important public health problem.

- Significantly worse than England average
- Not significantly different from England average
- Significantly better than England average
- No significance can be calculated

England Worst | Regional average + | England Average | England Best | 25th Percentile | 75th Percentile

+ In the South East Region this represents the Strategic Health Authority average

Domain		Indicator	Local No. Per Year	Local Value	Eng Avg	Eng Worst	England Range	Eng Best
Our communities	1	Deprivation	34587	21.4	19.9	89.2		0.0
	2	Children in poverty	8421	24.5	22.4	66.5		6.0
	3	Statutory homelessness	174	2.59	2.48	9.84		0.00
	4	GCSE achieved (5A*-C inc. Eng & Maths)	1009	47.7	50.9	32.1		76.1
	5	Violent crime	2540	15.7	16.4	36.6		4.8
	6	Carbon emissions	1244	7.7	6.8	14.4		4.1
Children's and young people's health	7	Smoking in pregnancy	465	22.2	14.6	33.5		3.8
	8	Breast feeding initiation	1384	66.0	72.5	39.7		92.7
	9	Physically active children	13892	59.3	49.6	24.6		79.1
	10	Obese children	206	11.7	9.6	14.7		4.7
	11	Tooth decay in children aged 5 years	n/a	1.3	1.1	2.5		0.2
	12	Teenage pregnancy (under 18)	172	51.7	40.9	74.8		14.9
Adults' health and lifestyle	13	Adults who smoke	n/a	22.6	22.2	35.2		10.2
	14	Binge drinking adults	n/a	15.9	20.1	33.2		4.6
	15	Healthy eating adults	n/a	23.0	28.7	18.3		48.1
	16	Physically active adults	n/a	9.6	11.2	5.4		16.6
	17	Obese adults	n/a	27.8	24.2	32.8		13.2
Disease and poor health	18	Incidence of malignant melanoma	19	11.9	12.6	27.3		3.7
	19	Incapacity benefits for mental illness	2935	29.2	27.6	58.5		9.0
	20	Hospital stays for alcohol related harm	2594	1470	1580	2860		784
	21	Drug misuse						
	22	People diagnosed with diabetes	7082	4.37	4.30	6.72		2.69
	23	New cases of tuberculosis	12	7	15	110		0
	24	Hip fracture in over-65s	130	479.4	479.2	643.5		273.6
Life expectancy and causes of death	25	Excess winter deaths	53	12.9	15.6	26.3		2.3
	26	Life expectancy - male	n/a	77.4	77.9	73.6		84.3
	27	Life expectancy - female	n/a	81.5	82.0	78.8		88.9
	28	Infant deaths	12	5.51	4.84	8.67		1.08
	29	Deaths from smoking	234	227.1	206.8	360.3		118.7
	30	Early deaths: heart disease & stroke	143	84.6	74.8	125.0		40.1
	31	Early deaths: cancer	208	122.6	114.0	164.3		70.5
	32	Road injuries and deaths	48	29.9	51.3	167.0		14.6

Physical Health & Wellbeing

Obesity

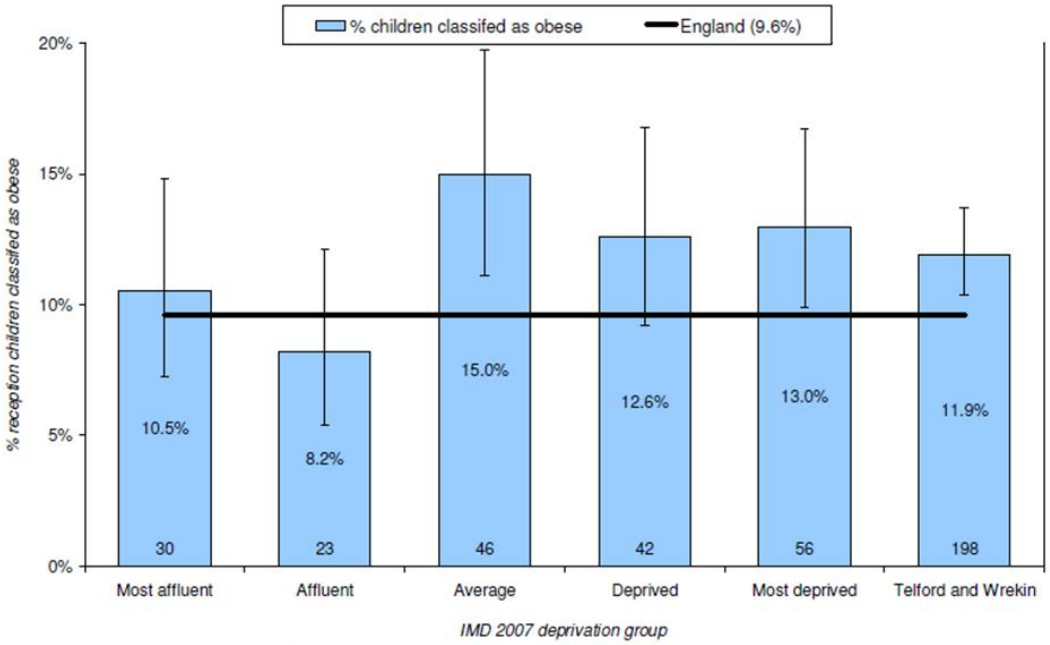
In the UK, over half of women and about two thirds of men are either overweight or obese[7]. Though there are inherent uncertainties in quantifying the link between obesity and associated disease, it is estimated that it costs at least £½ billion a year in treatment costs to the NHS, and possibly in excess of £2 billion to the wider economy[8]. Estimates for the annual costs to the NHS as a result of physical inactivity

[6] http://www.apho.org.uk/resource/view.aspx?RID=71297
[7] http://info.cancerresearchuk.org/healthyliving/obesityandweight/
[8] National Audit Office (2001) Tackling obesity in England: Report by the comptroller and auditor general HC220. http://www.nao.org.uk/publications/0001/tackling_obesity_in_england.aspx

are between £1 billion and £1.8 billion. The costs of lost productivity to the wider economy have been estimated at around £5.5 billion from sickness absence and £1 billion from premature death of people of working age[9]. Taken together, these costs total approximately £8.3 billion every year[10]. It is clear that tackling the obesity epidemic has financial benefits.

Obesity is regarded a key issue locally in Telford & Wrekin. In Reception year (4-5 years olds) the prevalence of obesity is 11.9%, this is statistically significantly worse than the national average for England (9.6%), see Figure 3. In Reception year the prevalence of overweight children is 18.2%, statistically significantly worse than the national average for England (13.0%). The prevalence of obesity and overweight symptoms in older children and adults is also higher than the national average for all age ranges.

Figure 3 Prevalence of obesity in reception year by deprivation group



The numbers shown in the base of the bars indicate the actual number of children classified as obese

Source: National Child Measurement Programme, West Midlands Public Health Observatory, http://www.communities.gov.uk/communities/neighbourhoodrenewal/deprivation/deprivation07/

[9] Allender, S. *et al*. (2007) The burden of physical activity-related ill health in the UK, *Journal of Epidemiology and Community Health* 61. p344–348; Ossa D. & Hutton J. (2002) The economic burden of physical inactivity in England. London: MEDTAP International

[10] Department of Health (2009) Be Active, Be Healthy: A Plan for Getting the Nation Moving http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_094358

High levels of obesity can lead to many associated health issues such as problems with joints and bones, high blood pressure, heart failure, increased risk of insulin resistance and type 2 diabetes. These issues have a financial impact, it is estimated that the cost to the borough of adult obesity is in the region of £42million per year[11]. Many of these diseases could easily be prevented by people leading more active lifestyles. Provision of locally accessible green infrastructure can promote healthier lifestyles as people are provided with the facilities they need to become more active day to day.

Cardiovascular Diseases

In Telford & Wrekin premature mortality rates (deaths under 75 years) from all circulatory diseases (heart disease, stroke and other related diseases) for all persons are statistically significantly worse than national average position for England.

Approximately 148 people in Telford & Wrekin (102 men and 46 women) die from circulatory disease before the age of 75 every year; 59% of these deaths are from coronary heart disease (66 men [45%] and 21 women [14%]), 20% are from stroke (19 men and 12 women)[12]. Table 1 shows the years of life lost from premature deaths; circulatory disease accounts for 36% of all deaths and nearly a quarter of years of life lost.

[11] CordisBright Consulting (2009) JSNA Deep Dive: Child and Adult Obesity http://www.telford.nhs.uk/Documents/docs_common/Publications%20and%20Policies/Publications/Joint%20Stategic%20Needs%20Assessment/03%20JSNA%20Deep%20Dive%20and%20HCNA%20Reports/14%20JSNA%202009%20-%20Obesity%20Deep%20Dive.pdf

[12] http://www.telford.nhs.uk/Documents/docs_common/About%20The%20PCT/Board%20Papers/2009/October/Agenda%20Item%2011.2%20Joint%20Strategic%20Needs%20Assessment%20(JSNA).pdf

Table 1 Deaths and years of life lost contributing to reduced life expectancy years of life lost[13]

	Annual average no. of deaths	% of total deaths	Years of Life Lost (Under 75 years)	
			Number	% of total
All Telford and Wrekin Deaths	**1,301**	**100%**	**7,527**	**100%**
All Cancers	373	29%	2,476	33%
Circulatory Diseases	465	36%	1,724	23%
Accidental deaths	26	2%	759	10%
Suicides and undetermined deaths	14	1%	384	5%

The JSNA highlights that besides tackling cancer, reducing coronary heart disease will have the greatest impact on improving life expectancy in the borough. Tackling obesity, which increases the risk of developing cardiovascular disease, is a key part of improving life expectancies. As stated previously provision of green infrastructure can support active lifestyles, and act as a preventative measure against disease.

Mental Health & Wellbeing

The World Health Organisation projects that depression will be the second largest single course of ill health by 2020[14]. However, there is little accessible data about mental health locally.

"There is no health without mental health"[15] is a new strategy recently released by the government. The document states that "the cost of mental health problems to the economy in England has recently been estimated at a massive £105 billion, and treatment costs are expected to double in the next 20 years"[15]. In 2005, 27.7 million anti-depressant prescriptions were written in England, at a cost of £338 million to public health service[16]

[13] Compendium of Clinical and Health Indicators / Clinical and Health Outcomes Knowledge Base (www.nchod.nhs.uk). The Information Centre for health and social care. © Crown Copyright
[14] http://www.who.int/mental_health/management/depression/definition/en/
[15] Department for Health (2011) No Health without Mental Health http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_124058.pdf
[16] Mind (2007) Ecotherapy: The Green Agenda for Mental Health http://www.mind.org.uk/assets/0000/2138/ecotherapy_report.pdf

Almost half of all adults will experience at least one episode of depression during their lifetime[17]. However, mental health issues are often complex and not openly discussed. Measures to improve mental health should be taken, even if locally specific statistics are not readily available as national research shows that 1 in 4 people will experience some kind of mental health problem in the course of a year[18].

Food & Nutrition

Another way of improving general health is to improve people's diets, this however requires (among other things) education. Healthy eating can be promoted through the use of allotments & community gardens, encouraging people to learn about where food comes from and how it is grown. Telford & Wrekin Council currently provide three allotment sites throughout the borough: Brookside, Randlay and Wellington. In addition, there are seven association managed sites within the borough located in: Admaston, Leegomery, Madeley, Sutton Hill, Newport, Stirchley and Woodside. As part of the Allotments Strategy for the borough a survey was carried out where 88% of respondents said there was a need for more allotments in their area.

Inequality

There is a strong association between deprivation and poor health in Telford & Wrekin. The areas with the highest levels of deprivation also have the highest numbers of people reporting poor health. 21.4% of the population live within the 20% most deprived areas in England[19]. As displayed previously in Figure 4 the prevalence of childhood obesity amongst 4-5 year olds is significantly higher than the national average in the most deprived quintiles.

[17] Andrews, Poulton & Skoog (2005) Lifetime risk of depression: restricted to a minority or waiting for most? British Journal of Psychiatry 187: 495–496.
[18] Office for National Statistics (2001) Psychiatric Morbidity Report http://www.statistics.gov.uk/statbase/Product.asp?vlnk=8258&More=N
[19] Indices of multiple Deprivation Data

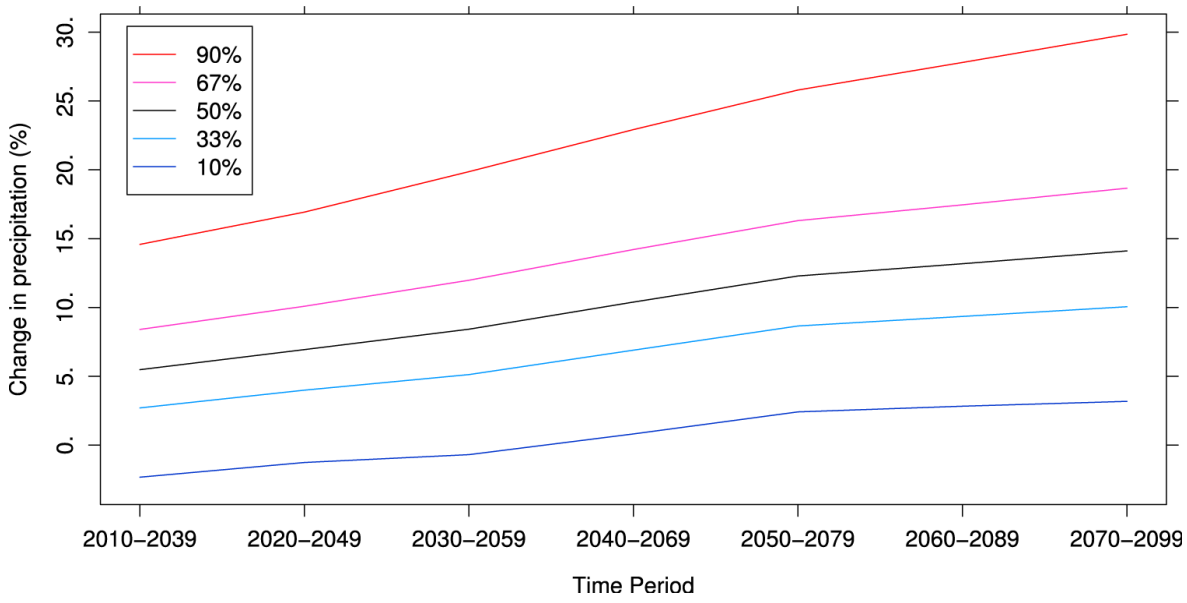
Appendix 10: Evidence and Justification behind Key Issues from Responsive Environments

Water Management

Decrease in net annual rainfall, yet an increase in heavy rain events, Warmer, wetter winters, Increase in flash flooding events and Increase in frequency of storm events

The UKCIP projections show an overall decrease in net annual rainfall, however during winter there is projected to be an increase in mean precipitation (See Figure 7, Figure 8 & Figure 9) and in storm events.

Figure 4 Change in winter mean precipitation (Low emissions scenario)[20]



[20] The graph shows varying probability levels (the relative degree to which each possible climate outcome is supported by the evidence available, taking into account current understanding of climate science and observations, as generated by the UKCP09 methodology.)

Figure 5 Change in winter mean precipitation (Medium emissions scenario)[20]

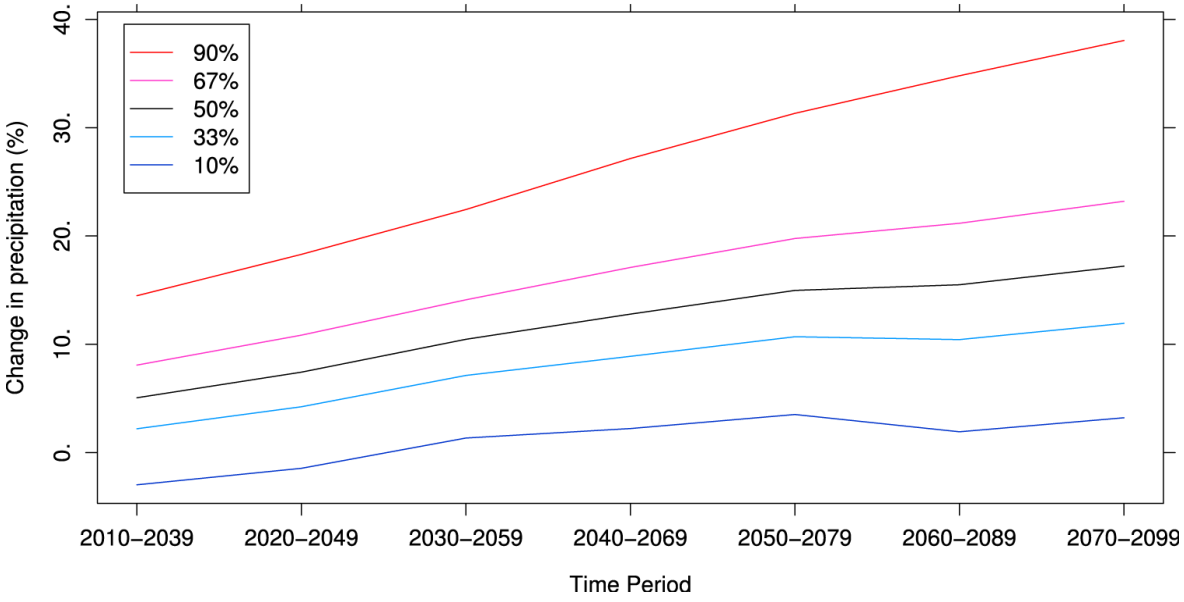
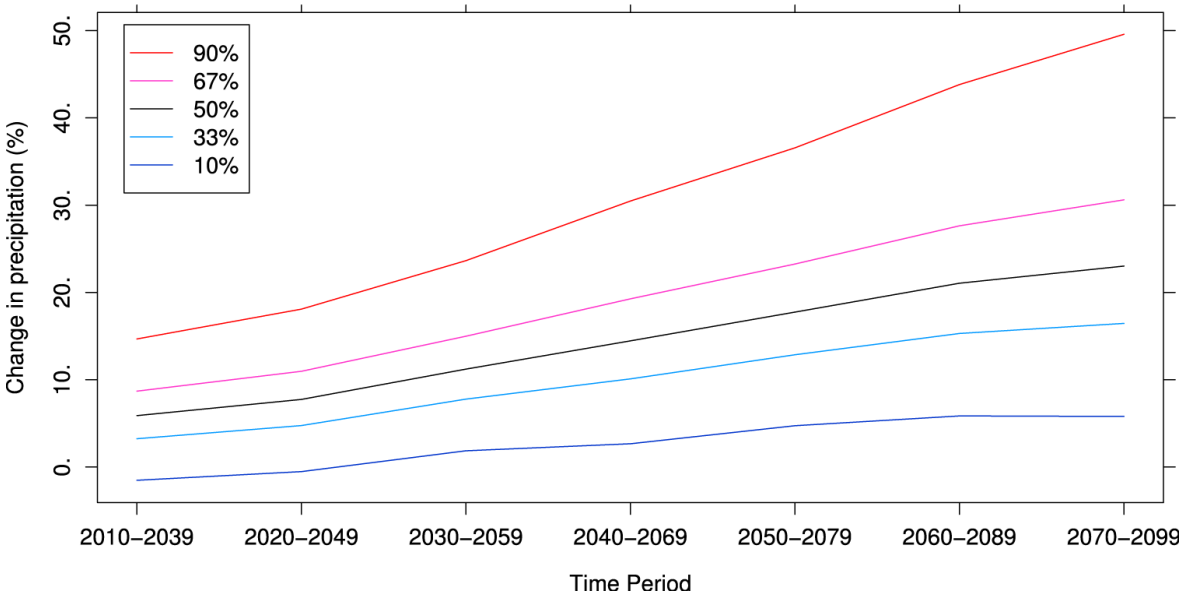


Figure 6 Change in winter mean precipitation (High emissions scenario)[20]



The Telford & Wrekin a Level 1 Strategic Flood Risk Assessment[21] (SFRA) provides information on the probability of flooding; taking into account different types of flooding and future climate change scenarios. The increase in winter rainfall (identified by UKCIP and the SFRA), could lead to increased risk of river flooding. River flooding can have severe social, economic and environmental impacts. For

[21] Halcrow Group Ltd. (2007) Telford & Wrekin Level 1 Strategic Flood Risk Assessment http://www.telford.gov.uk/info/1004/planning_policy/387/development_and_flood_risk/2

example damaging local infrastructure, causing disease and homelessness in local residents and destroying valuable habitats for wildlife.

Aside from river flooding increased winter rainfall could also lead to more surface water flooding. Higher precipitation levels at certain times of year will increase pressure on surface water drainage systems. In particular this will affect urban areas where impermeable surfaces dominate; this reduces infiltration of water into the ground and leads to localised flooding.

Land

A further impact of increased rainfall is an increased risk of subsidence and a greater risk of soil erosion and ground instability. Telford & Wrekin already has several areas of land instability, concentrated in the South of the borough including the Ironbridge Gorge, but also in other parts of the borough where mineshafts are present.

In the Ironbridge Gorge previous industrial activity has altered the landscape considerably. The underground geological structure of the Ironbridge Gorge and the effects of mining in the area have caused gradual land slipping for many years[22]. Landslips in the Gorge area over the last couple of centuries have seen the loss of a number of homes. Since 2001 Telford & Wrekin Council has spent more than £16 million on the land instability issue[22].

Temperature

Warmer, drier summers and increase in frequency and duration of heatwaves

The UK Climate Projections show potential future climate based on modelling work carried out by the UK Climate Impacts Programme (UKCIP). Figure 7, Figure 8 & Figure 9 show the projected change in annual mean temperature for the low,

[22] Land instability in the gorge – info pack 2010 http://www.telford.gov.uk/download/downloads/id/1395/land_instability_in_the_ironbridge_gorge_information_packk

medium and high emissions scenarios for the West Midlands. At all emissions scenarios the temperature across the region is increasing.

Figure 7 Change in annual mean temperature (Low emissions scenario)[23]

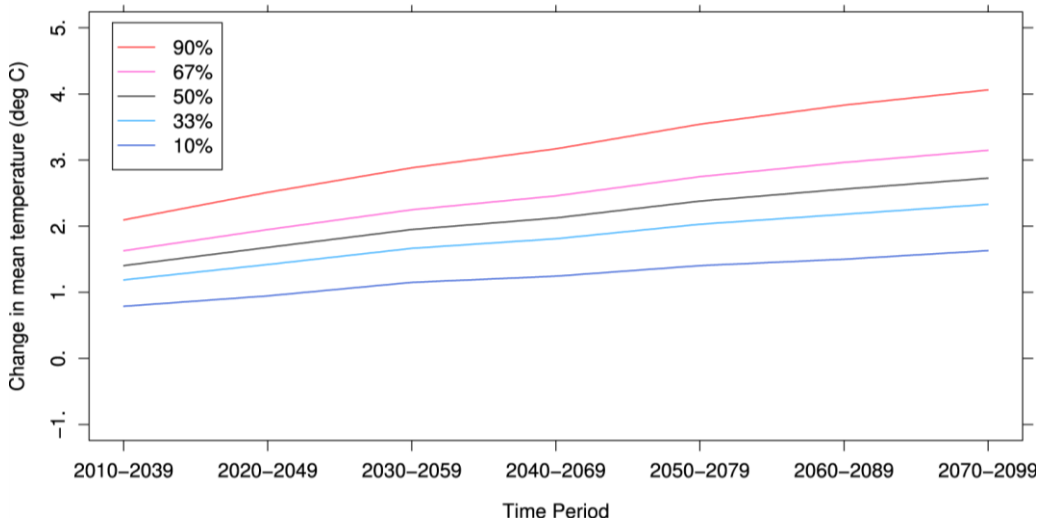
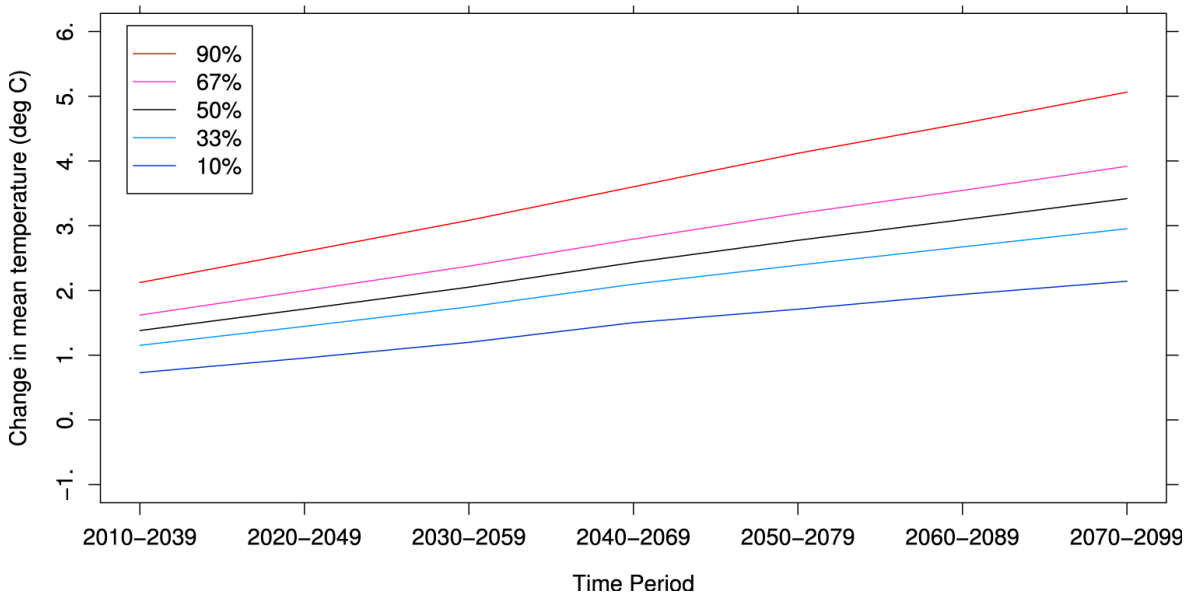
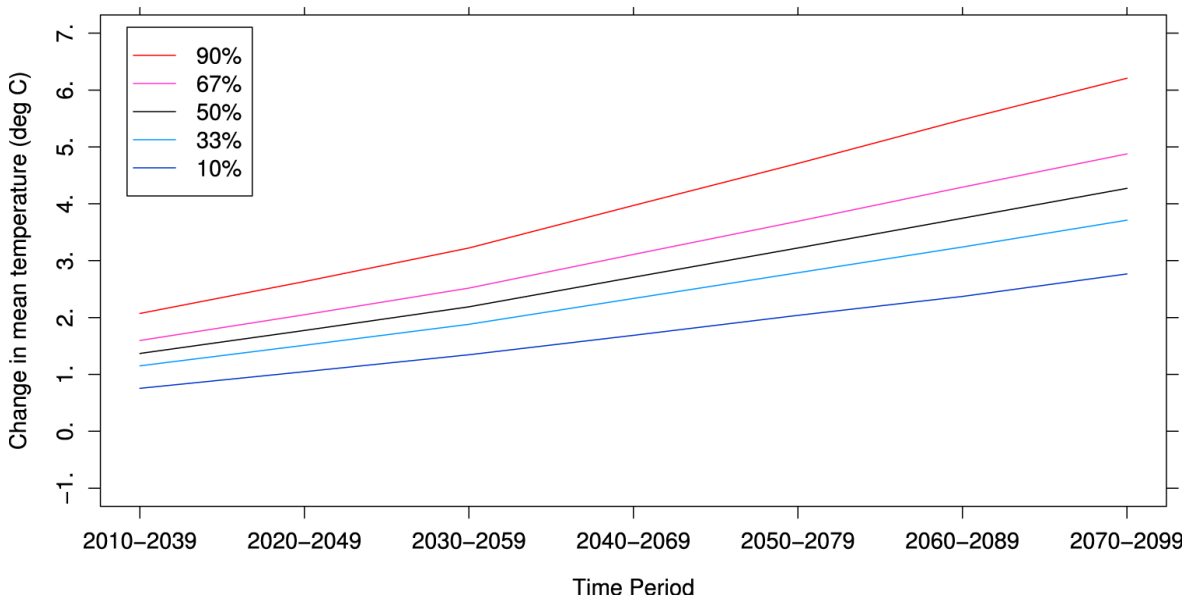


Figure 8 Change in annual mean temperature (Medium emissions scenario)[23]



[23] The graph shows varying probability levels (the relative degree to which each possible climate outcome is supported by the evidence available, taking into account current understanding of climate science and observations, as generated by the UKCP09 methodology.)

Figure 9 Change in annual mean temperature (High emissions scenario)[23]



Increased temperatures and frequency of extreme heat events can have several negative impacts. The Heatwave Plan for England[24] highlights the potential negative impact on public health of increased temperatures: patients suffering from heat cramps, heat rash, heat exhaustion and increased mortality. An initial evaluation by the Health Protection Agency estimates that there were approximately 300 excess summer deaths following the heatwave in 2009 between 30 June and 2 July[24].

Certain sections of the population are more vulnerable to heat stress than others; the Heatwave Plan for England identifies the elderly, the very young and those with chronic or severe illness as particularly at risk.

Energy

The Stern Review[25] states that climate change is the greatest and widest-ranging market failure ever seen. Stern found that failure to tackle climate change could result in economic costs of up to 20% of GDP per year, now and forever. In

[24] Department of Health (2011) Heatwave Plan for England: Protecting health and reducing harm from extreme heat and heatwaves http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_127235.pdf

[25] Stern (2006) The economics of climate change http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/stern_review_report.htm

comparison, the costs of effectively tackling climate change could be limited to only 1% of GDP per year. It makes clear financial sense to tackle climate change.

It is arguable that adapting and altering current systems to tackle climate change can bring economic opportunities:
"The shift to a low-carbon economy will also bring huge opportunities. Markets for low-carbon technologies will be worth at least £500bn, and perhaps much more, by 2050 if the world acts on the scale required."[26]

The UK has committed to a target of producing 15% of its energy demands from renewable energy sources by 2020. To aid this the government has introduced the Renewable Heat Incentive(RHI), the RHI will help accelerate deployment of renewable energy production by providing a financial incentive to install renewable heating in place of fossil fuels. This includes the use of biomass. Using biomass through the RHI could lead to economic benefits, reduced carbon emissions and a more sustainable way of managing green infrastructure.

[26] http://www.direct.gov.uk/en/Nl1/Newsroom/DG_064854

Appendix 11: Evidence and Justification behind Key Issues from Investment & Economy

Transport

Telford has come to be known as one of the UK's most 'car-friendly' towns[27] and this is reflected the town's connections to the Motorway network via the M54 and the major trunk road of the A442 which runs through the town.

Despite this, Telford & Wrekin has lower than the national and regional average for car ownership. This can affect resident's access to work and services if they do not have access to a car. Meaning that they must rely on public transport. However, the local bus service is considered to be poor[28]. Many of Telford's New Town estates were designed with the potential for 'busways' to run through their middle[29]. In reality these busways were never built. The routes that these would have taken are now large areas of green space within the middle of these estates and the buses have to travel around the longer circular rounds surrounding the estates, thus increasing the time and costs of running bus services. Recent regeneration work, particularly at Woodside and Sutton Hill, has seen some through routes reconnected through the centres of these estates, which have increased the potential to run more cost effective public transport in these areas.

Telford & Wrekin Local Transport Plan 3 identifies a need for more sustainable forms of transport, particularly in regard to walking, cycling and rail transport. Similarly, the Shrewsbury and Newport Canal Trust have a desire to restore the entire route of the canal which runs east-west across the rural area of the borough and close to the northern edge of Telford. Much of this route is now unrecognisable as a canal as it has become part of the wider agricultural land or overgrown with vegetation.

[27] Virgin Money survey of the 65 biggest cities and towns, 2008-2011
[28] Ispira Consulting on behalf of Telford & Wrekin Economic Development Board (2011) Telford & Wrekin Local Economic Assessment
[29] John Madin Design Group on behalf of Telford Development Corporation (1968) Telford Development Proposals

Regeneration of the canal as a green travel route would encourage more sustainable travel.

Employment & Industry

As Telford New Town developed in the 1960s/1970s, the local economy became focused on manufacturing and service sectors. Large new industrial estates were planned and built at Halesfield, Stafford Park and Hortonwood. These new estates provided industrial buildings set within open areas of green space and contrasted strongly with the heavy industry that preceded them. Despite the new development and investment in the area, the recession of the early 1980s saw the unemployment rate rise to 22.4% amongst men and 16% amongst women[30].

Since then, the economy of Telford has diversified and is now concentrated on the manufacturing, polymers, advanced engineering, construction, retail and tourism sectors. Manufacturing is decreasing at a slightly slower rate than other parts of the UK and the service sector is growing, particularly in property and business services[31]. The recent economic downturn has affected Telford & Wrekin, with the unemployment rate at around 8.5% in September 2010[32]. The predominant economic sectors in the borough are now business and professional services, wholesale and retail, engineering, health and social work[33].

Telford has a number of large 'campus' industrial sites. These are large sites, which may be many hectares in size, that are occupied by a single employer. Currently, in many cases only part of the site has be developed for industrial use and it is usually less that half of the site area. The remainder of the site usually comprises of large expanses of green space in the form of formally maintained grassland interspersed with planted trees and shrubs. The primary reason for these large expanses of land is to provide room for the future expansion of the industrial building within it, however

[30] De Soissons, M. (1991) Telford: The Making of Shropshire's New Town
[31] One Telford: http://www.investintelford.co.uk/about-telford/economy
[32] BCRS (2011) Recent Economic Trends: Shropshire, Telford & Wrekin
[33] Office of National Statistics (2007) Annual Business Inquiry

it also has the added benefit of providing an attractive setting for the employer, investors and employees.

Examples of campus sites in Telford include Maxell in Apley, Epson in Hortonwood, Ricoh in Priorslee and Denso in Hadley Park. Some of these industries have already expanded and developed in to their campus land. Across all of the campus sites in the borough there remain significant areas of expansion land left over. There has been a gradual decrease in the number of campus sites in the borough as some have been developed for wider uses. Examples of this include the former Mitutoyo factory site in Hadley Park which has been developed for a number of smaller industrial units and the former Celestica site in Priorslee which has now been demolished and is due to be redeveloped for a mixture of housing and employment.

Planning & Land

There is a significant amount of undeveloped land that was intended for housing, employment and other types of development in the New Town era. This land is currently green infrastructure.

Much of this land has planning permission to be developed under powers given by the New Towns Act 1981. In recent years the appropriateness of the sites identified for development in this way has come into question. Telford is no longer a New Town, its needs have changed and so has the planning framework within which developments must be considered. Until now there has been no assessment of the functions this land could be performing in its current state.

The council's Annual Monitoring Report 2010 identifies that there is 227 hectares of land with planning approval for employment development, and 524 hectares of land with approval for residential development.

The development of these sites presents both a challenge and an opportunity for appropriate green infrastructure provision in the borough, particularly so given their size. It could be beneficial in many of these cases to encourage temporary use of

these sites as a green infrastructure resource, for example, using a site as a temporary allotments site or as a tree nursery.

One of the attractions of Telford New Town was its lower density of development set within expanses of green space. However, some of Telford's older industrial and residential estates are now beginning to show their age, some are semi-derelict and are not providing a positive environment with which to attract investors.

Population & Housing

The population of the UK is growing[34], in Telford and Wrekin the population is forecast to increase to 206,600 people by 2026 – up from 167,200 in 2008. An increase of 39,400 people or 23.6%. The increase in population will lead to increased demand for housing. The West Midlands Regional housing target for Telford & Wrekin was 26,500 homes by 2026. During this period the population will 'age' as the increase in the older population will be relatively greater than for other age groups[35], this will result in an increased demand for certain local services.

Tourism

Tourism and the heritage economy are vital to the economic wellbeing of Telford & Wrekin. Ironbridge Gorge World Heritage Site is the most significant tourist attraction in the borough. The Ironbridge Gorge museums are also the 16th most visited attraction in England, having seen a 1% increase in visitor numbers from 566,967 in 2009 to 567,510 in 2010[36]. Similarly, Telford International Centre is in the top ten

[34] Office of National Statistics (2011) Statistical bulletin: Annual Mid Year Population Estimates 2010 http://www.ons.gov.uk/ons/rel/pop-estimate/population-estimates-for-uk--england-and-wales--scotland-and-northern-ireland/mid-2010-population-estimates/annual-mid-year-population-estimates--2010.pdf

[35] Telford & Wrekin PCT (2009) Joint Strategic Needs Assessment http://www.telford.nhs.uk/About-the-PCT/PublicationsBoard-Papers/Publications/

[36] Visit England (2010) Survey of paid attractions http://www.visitengland.org/insight-statistics/major-tourism-surveys/attractions/Annual_Survey/index.aspx

event venues in the UK with over half a million visitors each year[37]. It has recently expanded to 15,000m^2, making it the 5th largest facility of its type in the UK[38].

According to the Department for Culture, Media and Sport (DCMS), the UK tourism industry accounts for £90 billion direct spend each year[39]. In 2005 the tourism industry was estimated to be worth £104 million to Telford & Wrekin, the same year 1.5 million tourists visited the area[37]. The tourism industry is estimated to support 3,629 jobs in Telford & Wrekin[40].

There is projected to be 5% year on year growth in England's visitor economy over the decade 2010 to 2020[41]. Rural attractions in Telford & Wrekin include the Wrekin Hill and the Newport and Shrewsbury Canal (including the Longdon-on-Tern Aqueduct).

The West Midlands Visitor Economy Strategy suggests that "a competitive edge can be created in the tourism market by adding value through exploitation of the strong leisure brands in the region that convey world-class culture"[42]. The Cultural Strategy goes further by stating that the Ironbridge Gorge World Heritage Site would be key to this offer, and so would wider links with the heritage attractions and the wider countryside throughout Shropshire.

The Local Economic Assessment recognises that the borough's tourism assets are not always connected together to realise their full potential, as is the case with many of the borough's other economic sectors[43].

[37] Shropshire Council and Telford & Wrekin (2009) Evolution, Revolution & Innovation: A Cultural Strategy for Shropshire and Telford & Wrekin 2009 – 2014 http://www.telford.gov.uk/site/scripts/download_info.aspx?downloadID=434&fileID=1585
[38] Ispira Consulting on behalf of Telford & Wrekin Economic Development Board (2011) Telford & Wrekin Local Economic Assessment
[39] DCMS (2011) Government Tourism Policy
[40] 'Tourism Futures: Support for the Shropshire and Telford and Wrekin Visitor Economy', paper to Shropshire Council Cabinet meeting, May 2010
[41] Visit England (2011) A Strategic Framework for Tourism 2010 - 2020
[42] Advantage West Midlands (2008) West Midlands Visitor Economy Strategy
[43] Ispira Consulting on behalf of Telford & Wrekin Economic Development Board (2011) Telford & Wrekin Local Economic Assessment

The Olympic Games in 2012 is highly likely to increase visitor numbers in the UK. Whilst Telford & Wrekin does not contain any Olympic venues, it is anticipated that it will benefit from events connected to the Cultural Olympiad, particularly given the close proximity of Much Wenlock where the modern Olympic movement is considered to have begun.

Education

The Local Economic Assessment[43] identifies that heritage industries such as the Ironbridge Gorge Museums Trust and the Telford Steam Railway find it hard to recruit workers with traditional skills. It also suggests that there may be an opportunity for a joint initiative between the council, local training providers and museums/historic visitor attractions to create a centre of excellence for heritage skills.

Appendix 12: Evidence and Justification behind Key Issues from Community & Culture

People

Demography

Reflecting Telford's former New Town status, the population of the town is young. The proportion of the population under 25 is around 32.9%, which is above the regional average (31.8%)[44]. By 2026, 10,300 of the population is projected to be aged over 65, representing an increase of 45%, whilst the amount of people aged 85 and over will have increased by 112%, from 2,500 to 5,300[44]. This ageing population will create different demands for the use and provision of green infrastructure within Telford as there is an increasing trend for older people who need to stay fit, active and involved in society.

Currently, 84% of the population of the borough live in urban Telford, though this is only 28% of the land area of the borough[45]. The countryside is under increasing pressure from development. People often prefer to live in rural or semi-rural environments due to a perception that this will offer a more tranquil and authentic way of life[46], but also there is limited space left within the urban boundary to accommodate new development.

The Cultural Strategy identifies that a stronger 'green' conscience is emerging as people become more aware of the impact of climate change and the need to protect the environment. It suggests that there is scope to embrace this as part of the cultural agenda; by raising awareness, increasing understanding and appreciation of the environmental agenda, celebrating and using the green environment through countryside, parks, cultural programmes and education, supporting conservation

[44] West Midlands Regional Observatory (2008) West Midlands Regional Economic Assessment Telford & Wrekin
[45] Shropshire Council and Telford & Wrekin (2009) Evolution, Revolution & Innovation: A Cultural Strategy for Shropshire and Telford & Wrekin 2009 – 2014
[46] DCMS (2011) Government Tourism Policy

where people live ('In My Back Yard') and reducing the environmental impact of culture[49].

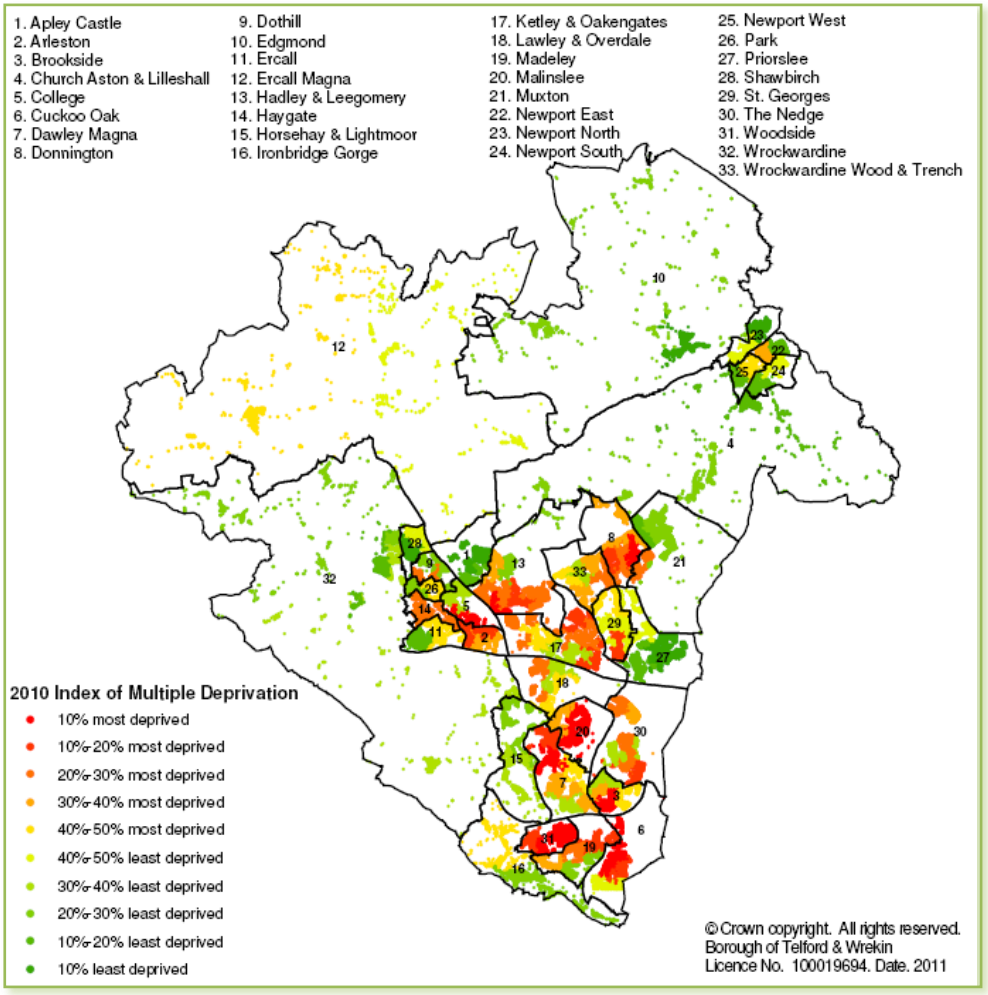
Deprivation

Deprivation is mixed across the borough, and its prevalence is increasing. The Index of Multiple Deprivation (IMD) 2010 identifies Telford & Wrekin as within the top 30% most deprived areas regionally and in the top 40% nationally. Out of 108 Super Output Areas in the borough, 14 are in the top 10% most deprived nationally and a further 12 are in the top 20%. This places 38,600 people (a quarter of the borough's total population) in the 20% most deprived areas of the country[47].

There are concentrations of deprivation in Arleston, Brookside, College, Cuckoo Oak, Dawley Magna, Donnington, Hadley & Leegomery, Ketley & Oakengates, Madeley, Malinslee, St Georges, The Nedge and Woodside. These concentrations are shown in Figure 10 below.

[47] Telford & Wrekin Council (2011) Telford & Wrekin Indices of Deprivation 2010

Figure 10 Areas of deprivation in Telford & Wrekin[48]



As Figure 10 shows, Telford & Wrekin also has a large number of areas with low deprivation. 15 Super Output Areas are in the 20% least deprived nationally. These areas are clustered in and around Newport and Wellington and at the edge of the urban boundary. The total population living in such areas is 23,300, or 14% of the borough's population. Substantially less than the number of people living the most deprived areas.

History, Heritage & Knowledge

When Telford new town was developed many new people relocated to the borough, partly attracted by the green nature of the area. Many green infrastructure related

[48] Telford & Wrekin Council (2011) Indices of Deprivation Report

initiatives from this era are well known by local people. Such initiatives include the 'Forest City' concept and the Green Network, both of which have become deeply rooted in the consciousness of the town.

The Shropshire and Telford & Wrekin Cultural Strategy underlines the importance of green infrastructure in Telford; "People enjoy the more urban shopping and leisure experiences afforded by Telford, but also appreciate its greenery, which includes a network of hedgerows, canals, meadows, some 400 acres of ancient semi-natural woodland and other open spaces, including the 170-acre Telford Town Park. Together, these aspects create a natural landscape which, at the time of Telford's development in 1968, was unique to new town planning, achieved international recognition and pioneered the way forward for new towns elsewhere"[49]

The culture of Newport and the rural area is deeply intertwined with its economic base of agriculture and food production. Newport and the rural area are much more traditional when compared to Telford. Agriculture and Food have been the traditional industries here for many centuries. This is reflected in Newport which is an historic market town and it continues to hold a weekly indoor market and the annual Newport agricultural show.

The Ironbridge World Heritage site is the key heritage asset of the borough. The green infrastructure surrounding Ironbridge is key to the character of the heritage of the area.

Arts & Entertainment

There are several festivals and events held in Telford & Wrekin annually. One of the most famous is the Ironbridge World Heritage Festival which celebrates the designated site. The World Heritage Site also has a year long calendar of special events, exhibitions and activities, some of which take place within the green infrastructure of the area.

[49] Shropshire Council and Telford & Wrekin (2009) Evolution, Revolution & Innovation: A Cultural Strategy for Shropshire and Telford & Wrekin 2009 – 2014

Other areas of green infrastructure play host to art and cultural exhibitions. A product of the New Town, Telford Town Park is now well established as a cultural gem at the heart of the town. It attracts over 1 million visits a year[50]. The Telford Town Park Strategic Framework highlights opportunities for the future of the park, these include:

- develop a cultural heritage trail with interpretation as part of the wider park interpretation strategy;
- explore opportunities to develop Stirchley chimney as an industrial heritage feature attraction in its own right;
- develop wider cultural heritage links between the Town Park, Telford and Ironbridge.

Sports & Leisure

As part of the Building Schools for the Future programme Telford & Wrekin is developing a number of Sports and Learning Communities. These developments concentrate education, health, sport and leisure facilities for local people on to one site[51]. The council owns and runs nine leisure centres which include the Madeley Court Outdoor Ski and Snowboard Centre and Horsehay Golf Centre There are a number of sports clubs in the borough, including Lilleshall National Sports Centre abuts the edge of the borough. These facilities are open for the community to use and many community sports groups are connected with them. Telford & Wrekin has a rights of way network that contains over 900 individual routes, totalling over 360 kilometres of path[52].

BMX is growing in popularity nationally. There are highly regarded local teams but facilities are considered to be poor[51].

[50] Shropshire Council and Telford & Wrekin (2009) Evolution, Revolution & Innovation: A Cultural Strategy for Shropshire and Telford & Wrekin 2009 – 2014
[51] Ispira Consulting on behalf of Telford & Wrekin Economic Development Board (2011) Telford & Wrekin Local Economic Assessment
[52] PMP on behalf of Telford & Wrekin Council (2008) Open Space, Sport and Recreation Facilities Study

The Cultural Strategy recognises that there are individuals and groups in society who are less likely to attend or participate in cultural activities. Amongst the reasons why this might be the case are perceptions that public spaces and public transport may be unsafe (particularly in the evenings)[50].

"Consultation conducted by Play England in 2008 found that parks and green spaces are very important to children and young people – these are where the great majority of children say they play and want to play. This is true for some older children and young people locally who want opportunities to socialise in safe open environments without being pushed towards structured youth provision"[53].

[53] Play England (2008) 11 Million

Appendix 13: Evidence and Justification behind Key Issues from Biodiversity & Geodiversity

Designated Sites

There are some species and habitats present in Telford and Wrekin which are nationally and locally important, and which need to be protected and managed appropriately to survive and flourish. The borough and the surrounding areas contain a range of sites that are internationally, nationally and locally designated for their biodiversity value: including national and Local Nature Reserves, sites of special scientific interest, ancient woodland, wildlife sites, and strategic wildlife corridors. These areas require specific management to ensure that they maintain their quality and value, some have already been designated and are therefore offered higher protection, others are still not classified. The majority of LNR's and wildlife sites in the borough are located in the urban area and may suffer from the effects of development, lack of appropriate management and visitor pressures.

Designated Landscapes

Similarly to designated sites designated landscapes often have public access, this can lead to potential conflicts between people, recreation and wildlife. This needs to be carefully managed so that the quality and ecological value of the site does not deteriorate over time. One of the main ways to manage pressure is to have an up to date and relevant management plan. Not all sites in the borough have this. Updating management plans is seen as a priority, with recent guidance and policy recommending that important sites are protected and restored so that they continue to be of value in the long term. The government has set targets within the England Biodiversity Strategy for bringing sites into favourable conservation management

Protected & Priority Species & Habitats

The Shropshire Biodiversity Partnership has indicated actions that are needed to protect and enhance this resource via the Shropshire Biodiversity Action Plan. Conserving biodiversity is a major challenge. We need to balance the needs of the natural environment with those of agriculture, the need for development such as for housing and people's quality of life. In Telford and Wrekin there are a number of species being lost or in decline. Telford needs to enhance existing biodiversity assets and restore biodiversity that has previously been lost to development and other pressures. The protection and enhancement of the existing green infrastructure is important to conserve natural assets, protect local distinctiveness and minimise habitat fragmentation.

Local authorities are required by European and National Legislation and policies to protect and conserve wildlife including flora and fauna, and their habitats. The Natural Environment and Rural Communities Act 2006 (Sec 40), requires local authorities to have regard to biodiversity conservation in carrying out their functions - referred to as their “Biodiversity Duty” and states that they should use Local Biodiversity Action Plans (LBAP).

The Dingy Skipper is an example of a UK Priority BAP species, which requires habitat on urban brown-field and post-industrial sites. The Telford & Wrekin area was identified as a regional stronghold for the Dingy Skipper by the Butterfly Conservation organisation in 1997. However, key sites for this species are threatened by development or natural succession.

Research and information available varies between species and habitats, with some groups better documented than others. Species records are collected by volunteer recording groups and the level of survey effort and accuracy varies. Habitats in the borough have only been broadly classified. Lack of data for an area could mean that species/habitats have been lost or there may be just a lack of survey effort. There is a lack of baseline ecological data and on-going monitoring; this adversely affects the accurate assessment of the extent of species/habitat loss. For example, research

suggests that Water Voles have disappeared from 95% of their former territories nationally, due to habitat loss and unsympathetic management[54].

Ecological Networks

Threats to biodiversity in Telford and Wrekin include demand for development, which can result in habitat loss and fragmentation. Many of Telford and Wrekin's biodiversity hotspots are on brownfield land, such as pitmounds. The current planning system aims to locate 60% of development on brownfield sites[55], however, the biodiversity quality of the brownfield sites must be assessed to ensure no negative effects on biodiversity. However, if carried out sensitively development can provide opportunities for improvements to biodiversity, through creation, enhancement and appropriate management of habitats.

Agricultural intensification and changes in agricultural, woodland and forestry management practices can impact on local habitat and species. Water abstraction, drainage or inappropriate river management can also cause habitat loss and degradation. For example the Weald Moors provide an important habitat for birds. Lapwings and other wading birds need wet grassland areas because they provide nesting habitat and abundant insect food for adult birds and their chicks. Improved drainage of these areas and historic conversion of grassland to arable production created a serious problem for lapwings and other birds, which rely on this habitat.

In 2010, the independent review of England's wildlife sites and ecological network, chaired by Professor Sir John Lawton, concluded unequivocally that England's collection of wildlife areas is fragmented and does not represent a coherent and resilient ecological network capable of responding to the challenges of climate change and other pressures. The review called for 'a step-change in nature conservation [...] a new, restorative approach which rebuilds nature and creates a more resilient natural environment for the benefit of wildlife and ourselves'.

[54] Whitchurch Community Water Vole Project http://www.woodlanereserve.co.uk/watervoles.htm
[55] DCLG (2011) PPS3: Housing (update)

The Making Space for Nature review of terrestrial wildlife sites argued that we must:

- improve the quality of current wildlife sites by better habitat management;
- increase the size of existing wildlife sites;
- enhance connections between sites, either through physical corridors or through 'stepping stones';
- create new sites; and
- reduce the pressure on wildlife by improving the wider environment.

Within the borough there is a high public demand for declaration of Local Nature Reserves, the following LNR proposals have recently been approved by cabinet:

- Southern extension to the existing Granville Local Nature Reserve
- Madebrook and Stirchley Dingle Local Nature Reserve

The following proposals are currently being considered and have not yet been fully consulted on or approved by cabinet:

- Southern extension to the existing Town Park Local Nature Reserve
- Madeley Pitmounds Local Nature Reserve
- Dothill Local Nature Reserve, Wellington

People & Nature

There is a strong group of volunteers present in the borough who help with, data collection , maintenance and management of the some designated sites. Groups such as "friends of" and the Green Gym are indispensible for helping protect sites within the borough. There is scope to expand these groups, particularly as part of the "big society".

Whilst volunteers are priceless, due to the reliance on amateur recorders and volunteers there is a danger of a lack of coherent and consistent data collection and management for protected sites. There is a need for greater data sharing and further green education.

Resilient Ecosystems

The benefits we get from nature are often described as 'ecosystem services'. Natural resources (such as food, timber and water) and functioning natural systems (such as healthy, fertile soils; clean water and air; and a regulated climate) are vital support services for our wellbeing and security, and are themselves sustained by biodiversity. Biodiversity & Geodiversity have inherent economic value, the TEEB project[56] concluded that degradation of the natural world was costing the global economy £1.3-3.2 billion per year. At a national scale Caroline Spelman MP is quoted as saying that bees alone are worth £440 billion a year to the UK economy[57]. Although biodiversity does not often have an obvious economic value, it provides a variety of ecosystem services without which life could not be sustained. Taking account of all the economic and non-economic benefits we get from these services enables decision-makers to exercise judgement about how we use our environment. Such an approach is often called an 'ecosystems approach'. The importance of managing ecosystems in a more integrated fashion, to achieve a wider range of services and benefits needs to be recognised by decision makers. This means, for example, linking goals on wildlife, water, soil and landscape, and working at a scale that respects natural systems and the natural features supporting such systems. An integrated approach to managing the natural environment, particularly at the landscape scale, should be promoted.

The Green Infrastructure Framework recognises that it is not just designated sites that are important to biodiversity, other types of Green Infrastructure present in the borough supply a biodiversity function through the provision of a habitat or corridor for wildlife.

Climate change is probably the greatest threat to the worlds ecosystems. As the climate changes, species will be displaced by higher temperatures and a different

[56] TEEB (2010) The Economics of Ecosystems and Biodiversity: Mainstreaming the economics of nature: A synthesis of the approach, conclusions and recommendations of TEEB http://www.teebweb.org/LinkClick.aspx?fileticket=bYhDohL_TuM%3d&tabid=1278&mid=2357
[57] http://www.bbc.co.uk/news/science-environment-11642538

climatic environment. It is projected that most species will seek to move Northwards and upwards. The movement of species will need to be monitored and managed to ensure the transition of species is not at the expense of another species.